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OBSTETRICAL OBSERVATIONS IN NEW ZEALAND.[1]

By R. MARSHALL ALLAN, M.C., M.D., F.R.C.S.E., F.R.A.C.S.,

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As the result of a recent extensive tour of New Zealand I am taking this opportunity to discuss certain aspects of the world-wide problems of maternal and infant welfare and to note the manner in which they are being tackled in the sister Dominion.

The population of New Zealand is not concentrated mainly in the capital city, as with us, but is more equably distributed through the Dominion. On the whole, road and rail communications are good, and there are not the extensive isolated areas with which we are more familiar.

[1] The retiring President's address, read at a meeting of the Gynæcological and Obstetrical Section of the Victorian Branch of the British Medical Association on April 30, 1931.

Trend of Maternal and Infant Mortality.

The maternal mortality of New Zealand is lower than either that of the Commonwealth or of Victoria. As in Australia, it is subject to yearly variations for which no adequate reason has yet been supplied. Puerperal sepsis claims about 38% of the total mortality—a proportion similar to the official figures for Victoria. It is probably more accurate than our own, because of the elaborate system of investigating all deaths and cases of pyrexia. There are, however, marked differences in the relative importance of the other causes of puerperal mortality. The toxæmias of pregnancy have a higher incidence in New Zealand, whereas the reverse is noted regarding deaths from hæmorrhage and as the result of difficult labour. On the whole the maternal death rate is highest in the rural areas as compared with the cities—the opposite of what has been recorded both in Victoria and New South Wales.

The still-birth rate is higher in New Zealand and has been rising during the past five years. It now represents 32·5‰ live births, as compared with 31‰ for this State.

New Zealand enjoys the enviable reputation of possessing the lowest infantile mortality in the world—34·1, as compared with 47·2 in Victoria. As is well known, these rates are largely prevented from showing a continual decrease by the number of deaths under one month due to causes usually associated with pregnancy and parturition. Thus we find that the mortality in the first month in New Zealand is 69% of the whole, as compared with 65% for Victoria. The crucial period lies in the first week, especially during the first day of life, and the New Zealand figures show that some improvement is occurring in this last group.

Hospital System.

The visitor notes at once the hospital system, which differs so radically from Australian practice. The Dominion is divided into areas, each with an elective board controlling hospital affairs. The board estimates the annual amount necessary for its requirements, and this is met partly by Government grant, but mainly from the local municipalities, who strike a special rate for such purposes. The hospitals are open to all classes of the public. Outlying centres are served by smaller district hospitals under the main boards. There is nothing equivalent to our bush nursing system.

As regards obstetric requirements the hospitals may be divided into four groups:

1. Saint Helens Hospitals. These are State maternity institutions under the direct control of the Government—seven in number. Two have 30 beds and the remainder from 12 to 15 beds. The patients are supposed to be the wives of workers earning not more than £5 per week. A charge of £3, recently increased to £5, is made for delivery and the usual puerperal period of ten to fourteen days. Incidentally, this does not cover the actual cost per patient, which varies between £6 and £9. There is a paid medical officer who attends to any abnormalities. These hospitals are used for the training of medical students and midwives. The majority of the buildings are converted houses, and contrast poorly with the more modern units of the hospital boards. The work done in them is, however, of the highest standard.

2. General hospitals. These are controlled by the hospital boards. The obstetric wards may be part of the general hospital or comprise a separate annex, not necessarily in the same grounds. The most recent of these separate buildings opened at Hamilton is the finest obstetric unit in Australasia.

3. District hospitals. District hospitals are usually small general hospitals with an obstetric annex.

4. Private hospitals. Many private hospitals are of the mixed type, but others are purely obstetrical. They do not differ in the main from our own, although the equipment is generally better.

While the hospital system of New Zealand provides an excellent service for the public, its relationship to the profession is far from just. The main trouble lies in the method of staffing the public hospitals, which varies greatly throughout the Dominion. In the main centres there is an honorary visiting staff in addition to the usual paid officials. Many hospitals are, however, closed, and the staff consists of a superintendent with one or two full-time assistants who are responsible for the treatment of all patients. In some instances this staff is augmented by a few specialists, who receive a salary for their services. In the district hospitals the local practitioners attend to all requirements.

Thus in many instances the majority of the profession is debarred from attending patients in any capacity in these well equipped hospitals, for whose erection and maintenance they as individuals are directly taxed. In the closed type of hospital the care of maternity patients may be undertaken by the superintendent, if he has a liking for the work, but is generally left to one of the assistants. Naturally, with a well equipped maternity block, to which any woman can be admitted, the majority of patients tend to go thither, and the practitioners in the town can only use private hospitals, which find it very difficult to compete on anything like equal terms with the board hospital. Last year a conference was held to discuss the possibility of allowing private practitioners to attend their own patients in these hospitals. Certain resolutions were carried, which would have converted the present system into a true community one, but so far nothing has been done in the matter.

Administrative Control of Obstetric Practice.

Apart from the obvious different distribution of the population and the hospital system, the visitor is impressed by the control which the Department of Health exercises over the practice of obstetrics throughout New Zealand. Acting under the Director-General of Health are a consultant obstetrician, an inspector of hospitals and a director of nursing. The Dominion is divided into areas controlled by ten full-time health officers, each with a staff of nurse inspectresses as far as obstetric requirements are concerned. The consultant obstetrician, Dr. Jellett, is responsible for advice regarding technical matters, in addition to investigating maternal deaths. This post has recently been abolished and the duties will probably be taken over by the new Professor at Otago University. The Inspector of Hospitals supervises the equipment and management of all obstetric hospitals, both public and private. The inspection of these hospitals is carried out with a thoroughness unknown here.

To aid in uniformity detailed regulations regarding equipment, procedures in cases of sepsis and the maintenance of an aseptic technique during labour have been drawn up by the Department. Compliance with these regulations is strictly insisted upon and forms the basis of any inquiry

into outbreaks of sepsis *et cetera*. We lag far behind New Zealand in this important matter.

All hospitals must furnish monthly returns which include *inter alia*: (a) the number of operations—forceps, version, dilatation of the cervix, manual removal of the placenta, Cæsarean section and destructive operations; (*b*) the number of cases of *ante partum* hæmorrhage, eclampsia, morbidity; (*c*) maternal and infant deaths; (*d*) patients transferred and the end results. These returns are forwarded by the matron to the District Health Officer. In cases of eclampsia, Cæsarean section and maternal deaths this official communicates with the doctor concerned, requesting him to forward details to Dr. Jellett. Dr. Jellett then comments on the case and on the method of treatment. All communications between the consultant and the practitioner are strictly confidential and pass directly and not through the usual departmental channels. So far this action has been purely voluntary on the part of the practitioner.

Incidence of Complications of Parturition.

Despite the facilities for antenatal care offered at the hospitals, at the numerous Plunket centres as well as by private practitioners, and also in spite of the enlightened public opinion regarding infant welfare, the importance of this preventive side of obstetrics was not apparently fully appreciated by many mothers, especially in the country. Albuminuria was very common, and the statistics show that the toxæmias play a most important rôle in the death rate. On the west coast of the South Island abnormally high blood pressures associated with albuminuria were common. Readings of 180 millimetres and higher were considered to be nothing unusual. This was at complete variance with what exists elsewhere, and the reason seemed obscure. The incidence of contracted pelvis was very low—probably even less than here. Although the records of the Obstetrical Society do not bear it out, conversations with many practitioners left the impression that *placenta prævia* was rather common and also more frequent than accidental hæmorrhage. I imagine that many cases have been wrongly diagnosed, and this opinion was corroborated by several men of wide experience. Occipito-posterior presentations occur as frequently as here, and present the same problems of management.

As certain matters deeply concern the practice of obstetrics, I propose to discuss them in greater detail.

The Conduct of Labour.

You have doubtless observed, both from the various reports of Dame Janet Campbell and the recent British Medical Association recommendations, that it is proposed to make the nurse largely responsible for antenatal care and for the delivery, provided it be normal. This is supported by Jellett, who, however, objects to the British scheme of allowing antenatal care to be done by the nurse, and insists that this should remain in the hands of the practitioner. The official view therefore is that pregnancy should be supervised by the doctor and normal labour left to the midwife, unless the patient specifically requests his presence. Professional opinion in New Zealand is opposed strongly to this conception of the best way to improve the present situation. They consider that just as antenatal care has been allowed to drift into other hands, unless they are careful, the conduct of normal labour may also be taken over by other agencies. If this be done, one fails to see how any doctor can be trained to recognize what is normal and when abnormality begins. Few cases are absolutely normal, and it is only by observation of many deliveries that a knowledge of the deviations from normal can be obtained and the practitioner so trained to know when it is best to interfere.

During their period of training midwives are allowed to administer chloroform during the second stage by means of a Murphy inhaler and a small amount of anæsthetic. In theory only one drachm is permitted, but the matron may increase this amount when necessary. This is part of the scheme to enable midwives to conduct normal labour, but I am not convinced of the advisability of allowing the administration of anæsthetics, except by a doctor.

The visitor notes the provision of separate bed pans and chambers for each patient, and also the adequate means of sterilizing and storing them after use. The Department also insists on the abolition of the full bath in the preparation for labour and the substitution of showers, a sloping board or a seat in the ordinary plunge bath, whereby the feet alone are immersed in the water. The dangers of vaginal infection and consequent sepsis when the ordinary plunge bath is used, are considered to be very real. This matter deserves more attention here than has hitherto been given to it. Rectal examination has largely replaced vaginal, especially when performed by nurses. New Zealand has also given us a lead in the provision of individual sterilized outfits for each case during labour, while in many hospitals the dressings for the puerperium are also kept in separate drums for each patient. There are also facilities at the main centres for the sterilization of outfits for domestic use. Bundles are made up in an approved fashion, and after sterilization are stored at home until required.

The Application of Forceps.

The use and abuse of forceps is a live problem in New Zealand. Reference has already been made to the monthly returns of all hospitals from which the forceps rate of any institution can be computed. In the annual report of the Department of Health emphasis is laid on the unduly high incidence in certain specified areas. The average for the Dominion has decreased gradually, and was 9·6% in 1929. Investigation of the rates for public hospitals shows a figure of 2·2%, as compared with 15·8% for private institutions. Individual hospitals are quoted with rates varying up to 57%. The validity of such

comparisons is rather dubious in the absence of further information as to number of cases, the types of case or the parity of the patients. As far as I can judge, Jellett considers that a forceps rate of 5% to 8% is satisfactory, but he makes no allowance for the undoubted differences between public hospital and private practice, nor for the undue preponderance of *primiparæ* in the cities as compared with many parts of the country. In my own report after investigation of the local conditions of private practice, any rate up to 30% was considered not to be unreasonable. Naturally, in country practices it was much lower and quite within the limits suggested by Jellett. Other factors arise in the metropolis which make such a low rate almost unattainable. The detailed records of a very able Wellington practitioner show a general average of 19·6% to 34% for *primiparæ* and 6% for *multiparæ*—figures which corroborate mine for Victoria and which are a fairer estimate than that of the Health Department.

As a result of the official propaganda the nursing staffs of all hospitals are placed in an invidious position. A frequent use of forceps in the monthly returns lays them open to severe criticism. Therefore, the matron endeavours to postpone such deliveries as long as possible, and exercises pressure on the attendants to fall in with her wishes. As examples of how such insistence on low rates can produce a curious mentality, I was informed that the Department had to state that a delivery was still by forceps if the blades had been removed prior to delivery of the head, or even if one blade had been introduced! Reference has already been made to the still-birth rate, which is rather high, and in part this may be due to the excessive official insistence on a low rate as indicative of good obstetrics. My own attitude to indiscriminate forceps application is well known, and I am not defending any unduly high rate.

Investigation of Maternal Deaths and Special Cases.

There can be no doubt as to the value of information in regard to maternal deaths, provided that it be obtained in a proper manner. If the official replies be couched in helpful terms, the response to such inquiries should be marked. But from evidence in many centres, the effect of such investigations have been the reverse. The position is a difficult one and is not made easier by the way the profession has been treated in the past by Government propaganda. This does not detract, however, from the value of the system. The investigation has certainly had a good effect in reducing the number of unnecessary Cæsarean sections and in making some men realize that more conservative methods in the treatment of eclampsia and of delivery in general give better results, both immediate and remote.

Notification of Puerperal Pyrexia.

In New Zealand three conditions are recognized as calling for action on the part of attending practitioners or the matrons of hospitals: puerperal morbidity, pyrexia and fever.

Puerperal morbidity is deemed to be present if at any time during her stay in hospital before or within twenty-one days after child-birth a woman has suffered from a febrile condition in which the temperature has risen to 37·8° C. (100° F.) or more on any two occasions or has been sustained during a period of twenty-four hours. It is not notifiable, but a record of such cases must be kept and forwarded monthly. A high rate would be followed by inspection of the hospital, with any necessary action taken to prevent further outbreaks.

Puerperal pyrexia is defined as any febrile condition (other than puerperal fever) occurring within twenty-one days of child-birth or miscarriage, in which a temperature of 38° C. (100·4° F.) or more has been sustained for twenty-four hours or has recurred during that period. Puerperal pyrexia is compulsorily notifiable by the licensees of maternity hospitals, but no notification by medical practitioners is required.

Puerperal fever or a reasonable suspicion of such is compulsorily notifiable by medical practitioners in all cases. Naturally, many cases would come originally under the definition of pyrexia and further investigation would separate them from others of extragenital origin.

Undoubtedly, in the past, owing to the manner in which these regulations have been administered, a vicious circle has been often produced. There was too marked a tendency to close hospitals for mild and isolated cases and to publish the fact in the local Press. This caused considerable financial loss to the matrons and tempted them to fake charts and to camouflage septic cases. A more sympathetic attitude is now adopted, and hospitals are not closed, except for good reasons. Discretion is used by the district health officers with any hospitals which have a good record of prompt notification and isolation of morbid cases, the faithful recording of temperatures and the use of an efficient aseptic technique during labour and the puerperium. But for those few instances where the hospital and attendants are suspect, stricter measures are insisted upon. In the past much irritation has been aroused by nurse inspectresses interviewing doctors and arguing as to whether a patient was septic or not. Care is now taken to delegate such duties to the health officer unless he is unavoidably detained elsewhere.

Mixed Hospitals.

In the last report of the Department of Health considerable space is given to a thorough analysis of the mortality returns from the different types of hospital. The well known Aberdeen report apparently showed that in that city the risks of child-birth were greatly increased by delivery in hospital as compared with domiciliary practice. For New Zealand it is shown that the death rate following delivery in hospital (3·7‰) is slightly lower than that following confinement elsewhere (3·9‰). As

65% of all the labours occur in hospital, this has a preponderating effect on the maternal mortality of the Dominion. An investigation of the rates for the various types of hospital shows that the mortality in mixed hospitals is greatly in excess of that noted in others dealing solely with obstetric cases or possessing isolated wards. The abolition of mixed hospitals in the larger centres is needed at once, but the problem in small centres is more difficult. The returns of our bush nursing hospitals—examples of small mixed hospitals—clearly show that, given good management and conservative methods of delivery, the risks are much less than the New Zealand figures would indicate.

Education of Students and Nurses.

Owing to the relatively small number of cases available in Dunedin, students must complete the practical work of their course at one or other of the Saint Helens hospitals. In the near future a full-time professor will be appointed—an advance in keeping with local changes, and likewise no reflection on the earnest efforts of those predecessors who did so well in the limited time at their disposal. The type of New Zealand travelling scholar with whom we are acquainted is a good advertisement of the course given at Dunedin. There are, unfortunately, no residentships at the Saint Helens hospitals, and graduates must proceed abroad for further experience.

The problem of the obstetric nurse has been approached in a better way than we have done. Two grades have been created—the midwife and the maternity nurse. The former are trained solely at certain hospitals, and when qualified are alone permitted to conduct normal labours without a doctor. Maternity nurses can work only in conjunction with a medical practitioner. Their course is shorter and is undergone at other hospitals, the strain on the main teaching institutions thus being relieved. These are thereby permitted to concentrate on women who intend later actually to practise and not merely obtain the extra certificate for higher positions.

Maori Obstetrics.

While not being able to observe a labour conducted in Maori fashion, I had the good fortune to discuss the matter with several experienced practitioners as well as reading an informative article by Dr. Wi Repa, of Poverty Bay. Although the Maori made most elaborate preparations to insure the fighting efficiency of his warriors, no reasonable scheme was evolved to combat what was recognized as an annually recurring threat against female life. Antenatal care does not exist to any extent. The diet consists of shell fish, meat and vegetables taken in quantities which would certainly kill the average white woman. Yet, contrary to current beliefs on diet, albuminuria is rare, and no medical man has ever seen a case of eclampsia in a Maori. *Ante partum* hæmorrhage is very rare, except for an occasional case of *placenta prævia*. Abnormal presentations are also uncommon. The average pelvic measurements, according to Dr. Wi Repa, are: Interspinous diameter, 26 centimetres; intercristal, 29 centimetres; external conjugate, 25 centimetres.

The time-honoured idea that child-birth was an unclean process is still believed. Maori homes possess no chairs, and the obstetric couch consists of some dirty mats or sacks placed on the earth floor, while in front of this couch is placed a kerosene case, against which the patient strains during labour. The *accoucheur* is usually some male relative—the grandfather, or, if he is not available, the husband. Women are not generally present, and if so, have to assist with averted heads and closed eyes. The time for active interference is judged by watching the depression below the xiphisternum, noting when increased pressure symptoms develop and when there is increased desire to pass urine and fæces. In the early stages the patient may assume a variety of postures, but when the *accoucheur* is called in, she kneels in front of him. He assumes a semi-sitting position and clasps her to his chest while the woman embraces the powerful body of her deliverer. Grasping her as in a vice, he forces his knees into the fundus of the uterus, and by the combination of contracting uterus, voluntary efforts of the patient, and the might of the assistant, the child is soon born. The Maori perineum is capable of considerable distension without laceration, but, as can be imagined, this powerful *vis a tergo* procedure often results in extensive perineal tears. The delivery is always conducted without exposure of the patient. The Maori word for labour means "to cause to be born" or "to make born" and this description of a normal labour shows that they are as modern as some of our exponents of the belief that man can improve on Nature. When applied too soon by inexperienced and anxious husbands, much bruising of the abdominal wall, exhaustion, and possibly cervical lacerations are likely to occur. Tough membranes are a frequent cause of delay, as there is a strict *tapu* on touching such structures. The only remedy is to call in the *pakeha* doctor. There is no objection to the white doctor making vaginal examinations. Like their European sisters, the better class women believe in quick deliveries and the cry for chloroform and "te tongs" is just as insistent as with us. The cord is torn across and not ligated. Delivery of the placenta is associated with much *tapu*. The Maori will in no circumstances manually remove either placenta or membranes. The patient is encouraged to bear down, and if this be unsuccessful, the placenta is left *in situ* until a white doctor is obtained. The placenta must always be buried in the grounds of the *pah*. If the patient appear to be likely to die, she is taken into the open, otherwise the house and contents must be destroyed by fire.

The *post partum* treatment is rather drastic, for in old days the mother was immediately taken to the nearest stream for the ceremonial bath of purification. In modern times this is replaced by a cold bath in the room, or in the upper circles by a tepid one, but the ritual must be undergone by all

women. *Post partum* hæmorrhage is regarded as a good sign, and is encouraged; any excess is usually checked by the cold bath and massage of the fundus. The powers of recuperation after severe hæmorrhage are remarkable. Finally, the mother is allowed to return to her filthy couch. Despite these methods, sepsis of a severe type is very rare, and the women possess a remarkable resistance to infection. They are probably saved by the strict *tapu* on vaginal examinations, traction on the cord and touching the external genitals. It is an essential part of the ritual that everything must be delivered by a downward pressure from above. The women arise on the second or third day and return to their duties. Subinvolution is common and prolapse frequent, but no patients come into gynæcological wards.

The authority of the elders and the indifference of their husbands are powerful influences preventing the establishment of modern methods. Registration of births and deaths is not compulsory, and it is difficult to obtain reliable statistics. As could be expected, the infant mortality is high, especially during the first week, often from cord infections. It is stated that the infant mortality under one year is 78‰, as compared with 34‰ for the white population, but even this figure must be only an approximation. Progress is slowly being made in the fight of the trained native nurse against the *tohungas* and old grandmothers.

Conclusion.

An attempt has been made to give some idea of the actual conditions in New Zealand, as they differ somewhat from our own. There was bound to be much bitterness shown by the profession when the Health Department, goaded on by ill-informed public opinion, proceeded to try to improve matters, mainly by legislative action. That era is now passing, because a new factor has brought about a better cooperation between officialdom and the practitioner. In 1927 Dr. Dunbar Hooper, Dr. Arthur Wilson and myself were present at the inaugural meeting of the New Zealand Obstetrical Society—a section of the British Medical Association composed of members willing to record their cases on a special form from which valuable records have been compiled. This Society now comprises 165 members and has been a great factor for progress, thanks to the indefatigable energy of the secretary, Dr. Doris Gordon. It was due to her magnificent efforts last year that a public appeal for a chair of obstetrics resulted in the collection of £31,000 within six weeks. The donors builded better than they knew, for in addition to founding a chair on lines similar to the Melbourne chair, there was a surplus of £6,000, which is used to establish travelling scholarships of the value of £150 for two years. The scholar commences at the Women's Hospital, Melbourne, for six months, when he is attached to the Professor. He then proceeds to Britain for the remainder of his period. While the first year must be devoted to obstetrics, he is permitted to study any other branch during the second year. By this wise provision the scholar returns well equipped in the essentials of the art of medicine. One wishes that some far-seeing benefactor would act similarly for this State. Meanwhile, why should we not emulate New Zealand and Queensland also in forming a branch of our Section which would record our work, thus giving those in authority an accurate account of obstetric practice and also stimulate others to maintain equally high standards?

The attitude of the Health Department to the Obstetrical Society has been most cordial, for it is realized that there is now an organized body of the profession with whom any necessary developments can be first discussed before any action be taken.

It was this Society which gave me the great honour of an invitation to visit the Dominion as their guest, tour the country districts in particular, and discuss local problems. My reception everywhere was most cordial, and I was able to have many frank talks with men whose standards were of the highest type. Our problems are not dissimilar and progress will be accelerated by such visits and interchange of views. Melbourne shows justifiable pride in her efforts at post-graduate work, and this reputation has crossed the Tasman. Undoubtedly our colleagues will come over in increasing numbers during the lean years before both of us, when trips to Europe must remain a dream. I have pledged the cooperation of all those attached to teaching hospitals to see that such visits will be well spent.

SPINAL ANÆSTHESIA: CLINICAL EXPERIENCES IN 430 CASES, AND A TECHNIQUE TO ELIMINATE POST-OPERATIVE HEADACHE.

By A. J. KENNEDY, M.B., Ch.M.,
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IT is with some diffidence that I suggest the publication of an article on spinal anæsthesia. I graduated and passed through the resident hospital stage with the idea that the amount of risk involved rendered its use unwarranted, an opinion which apparently is still held by the majority of practitioners. This paper is based upon a series of four hundred and seventy consecutive cases, in four hundred and fifty-seven of which the anæsthesia was required for major operations. I am quite aware that the number of cases is not large, but am able to speak with an intimate knowledge of each, inasmuch as in every instance the spinal injection, the operation, and the after-treatment were carried out by myself. Within the limits of such an article as this, it would not be possible to deal with the subject in an at all exhaustive manner, and I shall content myself with pointing out the more salient features of my own immediate experience. The paper is presented for the following reasons: first, to draw attention to a subject which receives little recognition in Australia, secondly, to explain a modified technique of injection which appears to possess

advantages over that commonly used, and thirdly, to describe experiments and clinical experiences in support of this claim.

The work was confined to operations below the diaphragm, as the cervico-dorsal block has not appealed to me.

The series covers an average range of operative work, and includes nephrectomy, pyelotomy, operations on the ureters, prostatectomy, operations for urethral stricture, cholecystectomy, operations for ruptured gastric and duodenal ulcer, operation for hæmorrhoids, appendicectomy, subtotal hysterectomy and the more common gynæcological operations, radical cure of hernia, an amount of cystoscopic work, operations on the lower limb *et cetera*. The ages of the patients ranged from eleven to seventy-nine years.

Results.

Complete anæsthesia was obtained in every case. In one instance there was a severe post-operative headache. In this case our usual technique was departed from. The special apparatus mentioned below was not available at the particular moment, and I used an ordinary Pitkin Luer-Lock needle. "Stovaine" was the anæsthetic used. In another case there was a transient diplopia, the patient incidentally suffering from disseminated sclerosis. "Percaine" was used in this case. Labat, after fourteen years' experience points out that these ocular paralyses are always of short duration.

I have never witnessed a dangerous collapse. There have been severe falls of blood pressure, more particularly in supraumbilical operations carried out under "Stovaine." In spinal anæsthesia there is always some fall of blood pressure which is apparently of mechanical origin, inasmuch as it varies directly with the area over which vascular paralysis is produced and the speed with which this occurs. Hence it is most severe with "high" "Stovaine."

In no other instance were there undesirable after-effects, immediate or remote, and, in fact, only one patient died within three months of operation (the result of head injuries received in a tree-felling accident).

The type of case was perhaps not of the exacting nature one commonly associates with the lists of a first class surgeon; there are no gastric resections, excision of the rectum *et cetera*. A noteworthy feature, however, is that the work was carried out in country hospital practice, which means that a large proportion consisted of urgent surgical operations. Many of the patients, as is common in the country, arrived at hospital late, and after having been transported over rough roads. In other words, the whole circumstances were quite sufficient to test out the limitations of any anæsthetic method.

Spinal Headache.

For lack of a better term I shall refer to the headache so common after lumbar puncture as "spinal headache." It is mentioned above that I have experienced one instance of severe typical post-operative headache, and, did I feel that such cases were unavoidable, I certainly should not feel justified in practising spinal anæsthesia. Most series of results of this work give the incidence of headache as ranging between 15% and 40%, so that this symptom is a very common feature. Apart from the standpoint of the comfort of the patient, it is essential that headache should be avoided, as it interferes with the correct posturing of the patient, which may be all important in the after-treatment, as, for example, in cases where Fowler's position is indicated. Authorities are varied as to the causation of spinal headache. For a time a group of physiologists maintained that a reduction of calcium content of the cerebro-spinal fluid was the basis, but this has been discountenanced by several workers, notably Neustadter[1] and Tolstoouchew. The general consensus of opinion is that the originating cause is leakage of cerebro-spinal fluid from the dural puncture, and our small experience would support this idea. In typical instances there is a latent period, ranging from some hours to two to three days (in my case it lasted three days). The headache then quickly increases in intensity, is accentuated when the patient sits up, and can be controlled by sedatives only when pushed to extreme doses. This, of course, refers to the severe case, as a number of milder spinal headaches are also met with. Even in these the influence of posture is a notable feature. Labat claims that the aspiration of twenty cubic centimetres of cerebro-spinal fluid will always relieve the headache, which confirms the later opinions that the symptom is the result of increased intracranial tension. I offer the suggestion that it is brought about in the following manner. The leakage of cerebro-spinal fluid from the dural puncture is greatest during the first twelve to twenty-four hours. This leakage stimulates the chorioid plexus to pass into the cerebro-spinal spaces an increased amount of fluid; this addition of fluid does not cease immediately after the puncture has become sealed, and thus the condition of increased intracranial tension arises. In my case the headache was cured by the use of hypertonic saline solution as is commonly employed to reduce intracranial tension in head injuries *et cetera*. However, it all returns to the hypothesis that the leakage of cerebro-spinal fluid is the essential cause, a view further supported by the work of Nelson,[2] who, by inserting pieces of catgut into the dural puncture hole in order to minimize fluid loss, was able to reduce the incidence of headache to 4·9%, as contrasted with 17·4% in a control series. Working on this theory, I have attempted to evolve a technique of injection which will make the smallest possible hole in the dura, a question which obviously is intimately associated with the gauge of needle used.

The ordinary lumbar puncture needle is a comparatively stout one, as the instrument-maker has been forced to provide an article which would penetrate the skin and the tough vertebral ligaments

without danger of breaking, the natural result being that a correspondingly large hole is made in the meninges. We have had prepared a short lumbar puncture needle, 18 gauge and 5·5 centimetres in length. This is inserted as far as the *ligamentum flavum* only. A very fine needle (diameter 0·558 millimetre), and having a short bevel, is then passed through the lumen of the stouter needle into the subarachnoid space. This inner needle is much too frail to penetrate the skin and ligaments except in the case of very young children, but by using the ordinary needle as a cannula it may be used to make a very small dural puncture from which leakage of cerebro-spinal fluid does not occur. Labat maintains that headache of consequence is rare with his needle, the diameter of which, however, is 1·1 millimetres, just twice the gauge of our needle. Spinal headache does not occur when the special needles mentioned above have been used. It is true that from time to time some patients will complain of headache, but it is not of the spinal type, is relieved by aspirin, and is only such as any sick person might have. In fact, it is the opinion of our staff that headache of any sort is less common in our patients who have spinal anæsthetics than in those operated on under general anæsthesia. The nursing staff considers that the convalescence of the spinal anæsthetic surgical patient is much easier, more free from shock and general post-operative complications than are other patients. I might mention that when it became necessary to operate on a member of our trained staff, she elected to have a spinal anæsthetic, and I have repeatedly had relatives of the staff brought to me for operation simply on account of the smooth convalescence of these patients.

Nature of Anæsthetic.

"Stovaine" was used in 402 cases according to Chaput's formula, put up in ampoules supplies by May and Baker ("Stovaine" 0·10 gramme, sodium chloride 0·10 gramme, distilled water to one cubic centimetre). Our average dose is five to six centigrammes for an adult, and this will give an anæsthesia of forty to fifty minutes only. While it is true that anæsthesia extending to a longer period may be obtained from time to time, it cannot be relied upon. When the anæsthetic level does not extend above the seventh thoracic segment, the condition of the patient is one of absolute comfort. If anæsthesia is required to a higher level, the patient will complain of nausea in 40% of cases and will actually vomit (generally slight) in about 10%. This is the result of the sudden severe drop of blood pressure. In four cases only was it necessary to use general anæsthesia (light ether) or local infiltration to complete the operation; in a nephrectomy, a difficult hysterectomy, the removal of an ovarian cyst, which necessitated an incision from the ensiform to the pubis, and in an appendicectomy. In this last case the dose of "Stovaine" used was only four centigrammes, and the operation proved to be rather more tedious than usual. "Stovaine" is the most convenient, and involves the most simple technique of all the spinal anæsthetic agents.

Undoubtedly this time limit is an objection from the point of view of the inexperienced surgeon, but as the muscular relaxation is complete, the work may be carried out much more expeditiously than under ordinary circumstances. However, I now reserve "Stovaine" for subumbilical operations which will almost certainly be completed within the time limit, and for conditions where Fowler's position will be required very shortly after operation. In these latter cases, owing to the comparative rapidity with which most of the effects of "Stovaine" are removed, the patient may be placed in the required position probably sooner than after general anæsthesia; whereas after receiving other spinal anæsthetics, and "Spinocain" in particular, patients require a longer period of recumbency or the Trendelenburg position is necessary. These remarks are true of "Stovaine" only if the dose is restricted to the amounts given above. I have on occasions used 10 centigrammes of "Stovaine" in upper abdominal work, and have found that five or six hours of recumbency are advisable after such a dose.

I am fully aware that "Stovaine" has an unenviable reputation as a spinal anæsthetic, but suggest that it is perhaps rather more safe than is commonly thought. It was the commonly used anæsthetic at a time when this work was imperfectly understood, and as recently as my student days was paradoxically enough reserved for the prostatectomy in the really "bad operative risks" and for similar work. I might mention in passing that Coleman[3] records 5,000 major operations under "Stovaine" spinal anæsthesia with one anæsthetic death, Jonnesco[4] 4,906 (of which 1,136 were cervico-dorsal cases) without a death, Desplas[5] 2,000 cases without a death, a group of Roumanian surgeons[4] 11,314 cases (of which 2,136 were "high blocks") with two deaths. Such fatalities as occurred in the above series were in "bad operative risks." These results have yet to be improved upon by the newer anæsthetic agents.

For work which might take more than forty-five minutes, and for upper abdominal operations I now use "Percaine" one in 1,500 solution, put up in ampoules of twenty cubic centimetres by "Ciba." This is a new anæsthetic to which my attention was attracted by reading articles by Howard Jones[6] and by Lake and Marshalls.[7] A further description of the drug is given in the recent article by Graham Brown[8] in THE MEDICAL JOURNAL OF AUSTRALIA. This substance is, of course, still on trial, but the indications are that it will prove of great service. Its particular characteristics are the great dilution in which it may be used, the intensity of its action and the length of anæsthesia obtained. I have used it during the past six months with extremely satisfactory results for nerve block and local infiltration in the upper extremities. I have used it on sixty-eight occasions only for securing spinal anæsthesia, as the necessary ampoules have been made available

in Australia only during the past few months. I have worked along the lines suggested by Howard Jones, but here again the fine needle plays a great part. Jones injects large quantities of the solution, for example, 18 cubic centimetres for splanchnic block *et cetera*. When such an amount is injected, the pressure of the cerebro-spinal fluid is greatly increased (the total amount of cerebro-fiinal fluid ranges from 100 to 130 cubic centimetres) and is sufficient to force the plunger of a ten cubic centimetre glass syringe back almost to the top. As our experiments suggest, there is probably under these conditions an escape of a quantity of a mixture of cerebro-spinal fluid and "Percaine" solution in unknown proportions. If our fine needle is used, there is little, if any, escape of fluid, and a smaller quantity of the "Percaine" solution need be introduced. We now find that 14 cubic centimetres will give anæsthesia for upper abdominal operations of one and a half hours, and have adopted this as a maximum dose. The results of "Percaine" spinal anæsthesia to date have been extremely satisfactory. The latest reports of "Percaine" would suggest that its early admirers rather exaggerated its freedom from toxicity and every care is still called for. This is a further argument for the reduction of the dose to a minimum. However, in the dilutions used it is certainly much less toxic than the average drug used for spinal anæsthesia.

Technique.

Patients having "Stovaine" are given 0·01 gramme (one-sixth of a grain) of morphine hydrochloride hypodermically half an hour before operation, with a view to allaying nervousness. We at first used larger doses, but found the tendency to nausea increased. I avoid morphine before "Percaine," as the "Percaine" patients show a tendency to drowsiness as contrasted with the wide-awake appearance of the "Stovaine" subject. I have found the morphine-"Percaine" combination very depressing, and these patients are given two to three pulvules "Amytal Co." (Lilly) one hour before operation. I restrict the amount of morphine and similar drugs before spinal anæsthesia, as I maintain that in this of all work respiratory depressants should be restricted to a minimum. It is commonly advised to give larger doses of morphine than the above, but still my small experience convinces me that the condition of the patient is much better without them. The patient's confidence is secured before he goes to the theatre by encouraging him to converse with convalescent surgical patients, and thus he comes to operation completely assured that pain will not be experienced.

The injection is made with the patient in the left lateral position. I will admit that the sitting-up posture renders the puncture a little easier, but it is more of an ordeal for the patient and is not applicable in the case of really sick people. As regards the actual lumbar puncture, it is customary to refer to it as an easy procedure, and it certainly is in the majority of instances. However, when spinal deformity, even slight, is present, there is offered a gentle exercise in judgement and tactile skill. I would suggest to the beginner that he should give a little thought to the anatomy of the part and that he should read a description of such small difficulties as might arise. An excellent article is given in Labat's book on regional anæsthesia.[9] I offer this advice without apology, as one constantly reads of otherwise good operators having 4% to 6% of failures to secure anæsthesia, and of excusing their results as being due to such phenomena as "dry spine" *et cetera*. "Stovaine" is injected at the first lumbar interspace for upper abdominal work and at the fourth for subumbilical work. "Percaine" is correspondingly injected at the first and third interspaces. The selected space having been chosen, an anæsthetic wheal is made in the skin by a 27 gauge needle, and for this "Novocain" 1% or "Percaine" one in 1,500 is used. Through this wheal the stouter needle is painlessly introduced and the tissues are progressively injected as the needle passes in. As it penetrates the deeper parts of the interspinous ligaments, a sense of lessened resistance followed by one of much greater resistance is felt. The needle has now reached the *ligamentum flavum* and is carefully introduced into the substance of the ligament, which is injected with a few drops of the local anæsthetic. This last injection is made with considerable force in the hope that the solution will be forced into contact with the outer surface of the dura. Too much care cannot be given to the process of rendering the whole needle tract insensitive. It is at this stage that the patient is apprehensive, and if he feels pain at all, his confidence is lost and his nerves will be on edge throughout the operation in expectancy of something worse. If one's judgement is correct, the point of the needle should now be within one centimetre of the spinal dura. This procedure is easier to judge than might be at first thought, and a little practice will give 100% efficiency. The really difficult cases arise in the osteo-arthritic spines, where there is not the same differentiation in ligamentous resistance. The fine needle is now introduced through the lumen of the outer needle into the subarachnoid space, and the injection of the anæsthetic made as slowly as possible (see Figure I). The stillette is replaced in the needle, which is withdrawn very slowly for the first couple of centimetres, and both needles are removed. The skin puncture is sealed with a small piece of strapping.

If "Stovaine" has been used, the patient is turned on his back and in three or four minutes anæsthesia is complete. The solution of "Percaine," however, is hypobaric with the cerebro-spinal fluid, and accordingly the patient is placed on his abdomen for five minutes in order to allow the anæsthetic to act upon the posterior nerve routes. He is then turned on his back and within a further five minutes will be ready for operation.

It seems superfluous to state that the whole procedure should be carried out with the strictest atten-

tion to asepsis. The apparatus, gloves *et cetera* should be boiled in redistilled water in a special vessel, as both "Percaine" and "Stovaine" form dangerous decomposition products when brought into contact with alkalis. This work should be delegated to the most responsible person of the theatre staff.

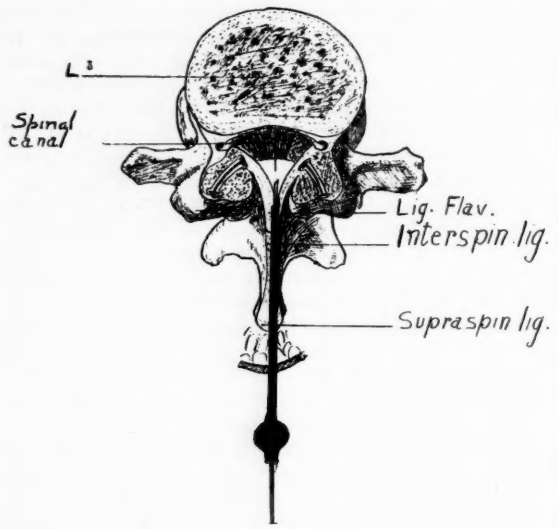

FIGURE I.

The patient is made as comfortable as possible on a well-padded table, a pillow is placed under his knees, a very low pillow under the head, and if necessary a small one in the hollow of his back. His hands are so fixed that he is free to move them a little. This small latitude does much towards minimizing the feeling of helplessness which may be very trying to the nervous patient. A high anæsthetic screen is erected so that he may not view the operation area or the instrument tables. Such conversation as might ordinarily occur in the theatre is allowed, as we feel that this does not create such an atmosphere of tenseness as does an attempt to preserve silence, the commonly advised procedure. An experienced sister remains at the patient's head and he is encouraged to talk if he so desire. Some, out of a spirit of bravado, will chatter unceasingly. Except when the needs of the particular operation require it, the table is placed in the horizontal position. The patient must be moved carefully, and violent changes in the table's position are prone to cause nausea. If the Trendelenburg position is required, the knees are not flexed. Symptoms attributable to severe fall of blood pressure are treated by tilting the table with the head end down, and if the patient has not improved at the end of the operation, the foot of his bed is raised on blocks. I have seen really severe falls of blood pressure only when using "Stovaine" in large doses. With "Percaine" the fall is more gradual in onset and of a less degree.

We do not now use ephedrine in association with spinal anæsthesia. We tried it in approximately two hundred consecutive cases, and ultimately came to the conclusion that it did not prevent or minimize the fall in blood pressure in the area of vascular paralysis. Pitkin and other American writers make very definite statements as to the certainty of its action, even when it is used subcutaneously. However, we have failed to reproduce their results. Moreover, the theoretical objections raised by Labat[10] and others would suggest that it is highly probable that the use of ephedrine under these circumstances is by no means free from risk of producing cerebral anæmia.

During the operation the patient often complains of dryness of the mouth, and is given small pieces of ice to suck, or his lips are moistened by a sponge. On return to the ward he is given spirits, tea or coffee if he so desires. It is a surgical treat to see these patients lying comfortably in bed with none of the vomiting and straining of newly sutured tissues, such as is a usual event after general anæsthesia.

Spinal Anæsthesia in General.

From the Patient's Point of View.—Operation patients in general prefer to be asleep, but we have never had trouble in securing permission for spinal anæsthesia from a patient who has previously had a general anæsthetic. The post-operative comfort is remarkable, a fact which I largely attribute to the absence of straining on the wounds. Our patients have been remarkably pleased with their experiences, and I have repeatedly had persons coming to our institution simply in order to avoid general anæsthesia. It is a striking fact that the elderly patient bears spinal anæsthesia very well indeed.

From the Surgeon's Standpoint.—The technique is much easier than are the ordinary methods of local anæsthesia, especially in abdominal work, Anæsthesia is quickly obtained, the muscular relaxation is perfect and must be experienced in order to be really appreciated. Vagal responses, of course, are still present, and one perforce learns to treat viscera with gentleness and to restrain the assistants from unnecessary dragging on retractors *et cetera*. This, of course, ultimately makes for better operating and is probably a factor in securing post-operative comfort for the patient. Norman Lake[11] states that he has secured vagal inhibition by the injection of "Percaine" into both sides of the œsophagus.

To operate on a conscious patient is not a greater strain on the surgeon, and in fact I prefer it in the worrying type of case. It is a greater comfort to be able to speak to the patient and to have him answer you than to hear a half-interested anæsthetist say: "Oh, she seems all right."

Under modern conditions the risk is not great. A review of recent literature by Rygh and Bessemer, covering 44,241 administrations, revealed a corrected mortality rate of one in 11,000.

The Standpoint of the Nursing Staff.—Here it achieves its greatest popularity, as the work is

reduced to a minimum. The tedious hours spent by the patient recovering from anæsthesia, with the incidental vomiting *et cetera*, are not necessary. The noise of these patients is removed from the ward, a feature which might not worry the staff very much, but which is very distressing to the other patients.

Miscellaneous Uses.

During the past two years one has frequently read of spinal anæsthesia being successfully used in the treatment of paralytic ileus. As an extension of this idea it has been repeatedly suggested that when the diagnosis between paretic and mechanical obstruction is in doubt, an injection of a spinal anæsthetic should be used as a test. This, however, may be dangerously misleading, and Duval,[12] in recording ninety-nine cases of mechanical obstruction operated on under spinal anæsthesia, points out that in sixteen there was an evacuation of the bowel after the spinal injection.

Spinal anæsthesia has undoubtedly a useful field in obstetrical manipulations when general anæsthesia is contraindicated.

I would suggest a further possible use, founded on two experiences of mine, namely, to secure the painless passage of ureteral calculi.

Two years ago I was treating a patient for a stone impacted in the ureter, and in whom colic had repeatedly occurred over a period of eight days. The presence of the stone was verified by X rays. Spinal anæsthesia was procured for the purpose of making an attempt to dislodge the stone with a ureteral catheter. Owing to a fault in the cystoscope no attempt to pass it was made. The patient had no more colic, and subsequent X ray examination showed that the stone had left the ureter. I concluded that the hyperperistalsis of the ureter under the influence of the spinal anæsthetic had resulted in the passage of the stone.

A few weeks ago I treated a patient whose condition was almost identical. Subarachnoid injection of five centigrammes of "Stovaine" again resulted in passage of the stone.

Animal Experiments.

In an attempt to study further the actual process of thecal puncture, I performed laminectomy on the lower thoracic vertebræ under chloroform anæsthesia on a calf two months old. I reproduced as far as possible the technique of puncture as followed in the human subject. The fluid injected was a strong solution of a dye (brilliant green), in order that its behaviour might be the more easily followed.

Certain observations of practical interest were made.

1. Immediately after the withdrawal of the needle there was a sharp gush of fluid. This ceased very quickly in the case of the fine needle, but at the end of half an hour the puncture was still oozing in two out of five cases when an 18 gauge needle was used.

2. Short bevel needles are best, but they must be sharp. A blunt one was used, resulting in a slightly irregular puncture, from the edges of which seepage was marked.

3. The flap in the *dura mater* described as resulting from puncture by the short bevel Pitkin needle is an actual fact, and in nearly every case did close the aperture. An important point revealed, however, is that if the needle is withdrawn with a jerk, it tends to suck the free edge of the flap right through the puncture hole and so create a definite opening. This accident is more likely to occur if the stillette is not first replaced in the needle, as the open end creates an aspirating effect.

4. When the pressure of the cerebro-spinal fluid was increased in a manner comparable with the injection of large doses of "Percaine" solution in the human subject, the immediate loss of fluid on withdrawal of the needle was quite marked, though much less when the fine needle was used.

Conclusion.

Spinal anæsthesia is a simple procedure, and accordingly the operator tends to give it less thought than it warrants. It must always be regarded as a serious undertaking, to be used only when conditions are suitable for it. When it is used with care, the risk is slight and the general results are excellent. If one were to master the technique of both spinal anæsthesia and the ordinary methods of securing local anæsthesia, one would be able to afford surgical relief to patients otherwise inoperable, and to others one would be able to promise a minimum of suffering. There will still remain a wide field for ether anæsthesia, but the indications for its use will be considerably curtailed.

Acknowledgement.

I am indebted to the staff of the Maroochy Hospital for their encouragement and kind assistance in preparing this paper.

References.

(1) M. Neustaedter, W. W. Hala and A. Tolstoouchow: "Relation of Calcium Content of the Spinal Fluid to Postlumbar Puncture Headache," *The Journal of the American Medical Association*, Volume LXXXV, 1925, page 347.

(2) M. O. Nelson: Quoted in "The Medical Annual," 1931, page 89.

(3) R. B. Coleman: "Spinal Anæsthesia by Stovaine," *The British Medical Journal*, March 21, 1925, page 548.

(4) Jonnesco and Roumanian Surgeons: Quoted in "The Practical Medicine Series"; 1923: "Surgery," page 21.

(5) Desplas: Quoted in "The Practical Medicine Series"; 1924: "Surgery," page 31.

(6) *Proceedings of the Royal Society of Medicine*, Section of Anæsthetics, March, 1930.

(7) N. C. Lake and C. J. Marshall: "Clinical Experiences with Percain, a New Local Anæsthetic," *The British Medical Journal*, March 15, 1930, page 488.

(8) R. Graham Brown: "Percain: The New Local, Regional and Spinal Analgesic or Anæsthetic," THE MEDICAL JOURNAL OF AUSTRALIA, May 16, 1931, page 598.

(9) Labat: "Regional Anæsthesia"; 1930, page 517.

(10) Labat: Quoted in "Nelson's Surgery," October, 1930, page 237.

(11) N. C. Lake: Section of Anæsthetics of the Royal Society of Medicine, *The British Medical Journal*, March 15, 1930, page 495.

(12) Duval: *Surgical Clinics of North America*, April, 1931, page 342.

NOISE, A NUISANCE DANGEROUS OR INJURIOUS TO HEALTH.[1]

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Wherefore is this noise of the city being in an uproar?
(Kings I: i, 41.)

You shall make no noise in the street.
(Shakespeare.)

Scarce could hear each other speak for the noise of clocks and chimes.
(Tennyson, *Princess.*)

OF late there has been much noise about noise and what noise annoys.

Even so conservative a body as the British Medical Association Annual Meeting, as recently as 1928, at Cardiff, carried unanimously a resolution to support any measures designed to suppress unnecessary noise, and declared that "any preventable noise between the hours of 11 p.m. and 6 a.m., which is injurious to health, should be regarded as a nuisance within the meaning of the *Public Health Acts.*"

The Right Honourable Neville Chamberlain, Minister for Health, replying to a deputation of eminent representatives of the British Medical Association, led by Sir Robert Armstrong-Jones, and the People's League of Health, led by Sir Thomas Horder, Bart., said:

It would be necessary to consider first of all how to define noises, and secondly, how to prevent them.

It is obvious, for instance, that such noises as the barking of dogs, and, I might add, the caterwauling of cats, which may be very distressing to people, especially at night, are noises which, nevertheless, it would be very difficult to prevent.

It appears to me that, the fact of these noises being as it would appear almost inseparable from our city life, the conclusion to which you might be led would be rather to take your hospitals somewhere else than to try to stop the noises round about them in places where they stand today.

One thing I do feel very strongly, and that is that we still lack precise knowledge upon this subject, and there is a wide scope for further investigation.

Mr. Chamberlain considered something more reliable was required than opinions which are *prima facie* on the question of noise; such opinions were required as are founded on definite scientific measurements and accumulative data, which would enable us to see what is the damage that may be done, what, for example, is the precise form of noise which causes the most damage, and, therefore, what are the points to which we ought most carefully direct our attention.

Thanks to the recently issued report of the Noise Abatement Commission of the City Health Department, New York, the most comprehensive study of the subject yet made, invaluable, not only to the people of America, but to the people of every country affected by the noise problem, we now not only have the conclusions of the expert physicians, neurologists, otologists, lawyers, psychiatrists and engineers, but recommendations by which the public, by its own efforts, can contribute to the elimination of noise, the unpleasant and even dangerous by-product of our machine age. This report is a model, couched in language all may read and understand, with a wealth of illustrations, including photographs, charts, cartoons and simple graphs.

In New York the chosen authorities nominated by Dr. Shirley W. Wynne, City Health Commissioner (among whom one is proud to note an American cousin, Lawson Purdy, Director of United Organized Charities and Commissioner of the Zoning System of Replanning), have not only investigated with great thoroughness the problems of city noises, but by the Press and the radio, by poster and pamphlet, and by every other available means of publicity, have impelled the masses, on whose behalf they are working, to be interested in and to approve of what is being done on their behalf.

Whenever one takes up a new subject, one looks to the Bible for inspiration. Noise is specifically mentioned in Cruden's Concordance to the Bible 66 times, by Shakespeare 87, and Tennyson 36 times.

Noise, in the Bible, may be classified as in the case of noise of the world generally as originating from: (i) animate nature, (ii) war, (iii) building and construction, (iv) traffic and transportation, (v) manufacture, (vi) commerce, (vii) communication.

The Noises of Animate Nature.

The sounds emitted by animals are either to attract the opposite sex, when they are intended to please, such as the cooing of doves, the neighing of horses, the mooing of cows, and the warbling note of the nightingale; or to terrify and drive away foes, as the roar of the lion, the growl of the tiger, the laugh of the hyena, and the cry of the coyote.

There is a difference in animal sounds, dependent on time and place, well illustrated in the bark of a dog, as a welcome to the wanderer returning home with the milk, and a vicious challenge to the so-frequent burglar on Bellevue Hill.

The Noises of War.

Many incidences in the Bible show how effective is noise in war. Isaiah (ix, 5) comments: "For every battle of the warrier is with confused noise and garments rolled in blood," and (Isaiah, xxiv, 18): "He who fleeth from the noise of the fear shall fall into the pit"; also (Isaiah, xxxiii, 3): "At the noise of the tumult the people fled." Jeremiah (iv, 29): "The whole city shall flee for the noise of the horsemen and bowmen," and "The noise shall come even to the ends of the earth, for the Lord hath a controversy with the nations." No doubt this latter is interpreted by the Anglo-Israelites as a forecast of the world war.

How successful noise was in war for *"Schrecklichkeit"* is mentioned by Dr. Walter A. Wells in

[1] Read at a meeting of the Sections of Neurology and Psychiatry, Hygiene and Preventive Medicine, and Oto-Rhino-Laryngology, of the New South Wales Branch of the British Medical Association, on August 14, 1931.

"Noises of Civilization and Their Evil Effects" (*Annals of Otology, Rhinology and Laryngology*, March, 1931. "For the Lord had made the host of the Syrians to hear a noise of chariots and a noise of horses . . . . and they said one to another, Lo the King of Israel hath hired against us the Kings of the Hittites and the Kings of the Egyptians to come upon us. Wherefore they arose and fled in the twilight and they left their tents and their horses and their asses, even the camp, as it was and fled for their life" (Kings II: vii, 6, 7).

In days of old, when knights were bold and barons held their sway, they were at least spared the din of heavy artillery, although, if one may believe Cervantes ("Don Quixote"), they made enough noise to "fright the souls of fearful adversaries."

As for modern warfare, from the dress circle, the deck of the transport ship *Minneapolis* (afterwards torpedoed), watching the bombardment of Krithia at the Dardanelles on May 8, 1915, when a hundred guns a minute, including the guns of the *Queen Elizabeth*, were fired for fifty-five minutes before the final attack, one was almost deafened by the noise. This was a mere fleabite compared with that in the zero hour at Messines (so accurately foretold by the Barber of Steinwerk, not our D.D.M.S., Major-General Barber, C.B.) or at Passchendaele, where both sides made night and day hideous with the din of artillery. In modern warfare noise is overwhelming, harmful alike to friend and foe—really one army performing *hari-kari* and making a dreadful noise about it.

Building and Construction.

Solomon, the wisest man, evidently highly sensitive and susceptible to noise, directed that the cutting and chiselling of the stone for the temple should be done so far away that "no sound of hammer or axe or any tool was heard in the house while it was building."

If building, especially that entailing steel riveting, could (and it can) be carried out from the point of view of Solomon, many ruined ears and shattered nerves would be saved. When Sydney was going through its hypertrophy of building, the hideous din of rock drills, excavating shovels, pneumatic hammers and riveting machines made the city, not only noisy, but dirty; but this, alas, is only a memory in these days of the dole.

A week before he died I saw the late Mr. Chief City Commissioner Fleming start when the evening barrage of blasting for the City Railway Construction began near the Town Hall. He said: "Cannot you stop that, Doctor? It must be very bad for people's health." I replied: "I should think so, but you would be better able to stop it than I. It is the Crown that is the offender (although the Crown can do no wrong, even it is not exempt under the *Public Health Act*). It would be necessary to prove that it is a common nuisance injurious or dangerous to health. It would be less trouble to ring up Dr. Bradfield and ask him to postpone his evening *feu de joie*."

Traffic and Transportation.

In New York it was found that 52% of the noise was chargeable to traffic and transportation. Heavy buses, vans and trucks, running on solid tires, or with loose gears and chains, were the worst. The 20,000,000 American motor cars, with their horns, sirens, whistles and bells, were a prolific source of noise. The clatter and clang of trams and the elevated railway in New York were evidently more harmful and disturbing than the trams in such a congested narrow Sydney street as Pitt Street. Sometimes in Sydney one cannot hear oneself speak.

Mr. Cleary, Commissioner for Railways, recently investigated the cause of noise on the Newcastle express, and following the making of graphs by Assistant Professor Edgar Booth, it has been possible to some extent to improve the condition.

The noise of water transportation is well illustrated in Sydney Harbour by fog horns, sirens and whistles of tug-boats, and above all by motor yacht exhausts, not yet forced to have silencers.

The most recent addition to the world's noise is the aeroplane. So intense is the noise that pilots and passengers must wear ear plugs and forgo conversation *en route*. Some are actually deaf for a short time after landing.

Manufacture and Commerce.

Modern industries and factories apparently cannot be carried on without noise in this machine age.

Avoidable noise, the curse of modern life, with its inevitable toll of nerve energy, neurosis and intractable insomnia, is well illustrated by the noises of our streets. In addition to the strident horns of motor cars and cycles, the clanging of bells, exhausts without efficient mufflers, trucks without pneumatic tires, tramcars, faulty loading, excessive speed and, occasionally, bad roads, in the early morning the voices of the iceman, butcher, milkman, baker or itinerant vendors are loud in the land, also the raucous shouts of newsboys calling "daily paper," "extra," "terrible murder," "another shark tragedy at Bondi." But pray, "From battle, murder, sudden death and the 'loud speaker,' good Lord deliver us."

Communication.

The telegraph, telephone and radio, whilst contributing to the convenience of the public, also inflict an inconvenience in increasing the noises of so-called civilization.

The click of the telegraph keys or the ringing of the telephone bell may not be disturbing, but the squawk of the radio from, I imagine, the flat above or below, is disconcerting. When a psychiatrist, psycho-analysing a patient, is disturbed by a loud speaker bellowing out "It's a long, long way to Tipperary," you can quite understand how difficult it is to use a stethoscope in the Queen Victoria Building, with trams on three sides, unless one keeps the windows tightly shut, thus scamping air.

The typewriter of the old hammer blow type is an annoyance. The silent typewriter lessens errors in accounts, makes less difficult dictation of letters and allows conversation without distraction.

Noises of civilization, formerly confined to factories, railway stations and cities, have spread to the country by motor car, aeroplane, power plant and radio. Noise is heard not only on the land, but in the air and the sea below.

Even if the noise-disturbed Sydneyite escapes to the Blue Mountains or Kosciusko, he cannot escape raucous horns, screeching sirens or aeroplanes; or, if he goes to the seaside, the eternal chug chug and shrill whistles of motor boats. Wherever he goes, except to Lord Howe Island or the Pacific isles, he is assailed with filtered jazz music from the inevitable radio.

Effects of Noise on Health.

The ear may suffer loss of function, become abnormally sensitive, or acquire tolerance to noise. An organ subjected to an extraordinary stimulus must either adapt itself thereto or suffer. Phylogenetically, the special sense of hearing is the most recently developed. When the eighth nerve of auditory and vestibular fibres is affected, as in toxæmia, the auditory portion is the more vulnerable. The auditory function suffers from overstimulation by sound. The retina is protected by eyelids; there are no earlids for Corti's organ for protection, either night or day, from noise.

Deafness is not commonly due to noise, unless the individual is continuously exposed at close quarters to an intensity of noise, as in boilermaking. Deafness in these cases is due to nerve degeneration and is incurable. Explosion of bombs and heavy machine guns during the war caused rupture of the tympanic membrane and hæmorrhage.

In Sydney, by day, there is a continuous roar and hum, with occasional exacerbations from passing trams. Night, or rather early morning, is fairly quiet, as the modern night club has not yet become a feature of Sydney life. The people have either developed a tolerance of noise, auditory hyperæsthesia, or the noise habit. In a few, noise has increased sensitiveness.

Schiller, Goethe, Carlyle, Dickens, and Herbert Spencer clamoured against noise. Carlyle dreaded the sound of cock-crow, and, like Mr. Fisk, of Amalgamated Wireless, Limited, had a sound-proof workroom. Schopenhauer, the German philosopher, who blamed propinquity for marriage, was tortured by the crack of a carter's whip, and believed that "noise is the true murderer of thought." Herbert Spencer used to plug his ears with wool. He said: "You might gauge a man's intellectual capacity by the degree of his intolerance of unnecessary noises."

To acquire tolerance for noise is easy. To retain sensitiveness to fine sounds is difficult. Some people are actually unhappy unless surrounded by noise. People from a noisy city like Sydney sometimes find the silences of the country oppressive; they cannot sleep, and are restless and unhappy until they hear again the roar of the city. Some actually, like children, love the noise of drum and penny trumpet. They seek the excitement or have an actual craving for noise, or "ptupomania," an American ailment produced with "jazz," easily adopted by Australia.

Sharp, sudden sounds arouse an instinctive fear reaction, inherited from remote ancestors, who had to be on guard against enemies, and to whom sounds sometimes were signals of danger. The mere explosion of a paper bag generally makes one start.

There has been a decline in the birth rate in all civilized countries coincident with the machine age. The birth rate in England and Wales in 1877 was 36·2 per 1,000; in 1928 it was only 16·7. From similar high rates in the United States of America it fell to 18·2, in France 18·2 and in Germany to 18·6. Wherever machine civilization is not a factor, the rates have remained high; in Ceylon in 1928 the rate was 40, in Egypt 43·3.

The rising incidence of mental disease noted in all civilized countries in recent years, is even more serious than the decline of the birth rate. In the United States of America the inmates in the institutions for the insane and feeble-minded outnumber those in hospital for all other disabilities.

Rest and sleep are requisites as well for the body as the soul. Noise causes fatigue, irritability and insomnia. Noise, a bad by-product of civilization, hinders those intellectual functions upon which the progress of civilization depends. As Dr. Walter A. Wells says: "It is the ash which unremoved will eventually extinguish the fire." Unfortunately there seems little escape, unless the public is roused to a recognition of the evil of noise.

Edison says that city noise must inevitably grow greater and that the man of the future will be deaf. Without accepting the pessimistic doctrine that the ultimate destiny of the city dweller is deafness, we must recognize that the noises of the civilized world are steadily on the increase. Not only are new machines made daily, with a consequential increment of incidental noises, but—and this is the crux of the matter—machines are being now devised and are coming into use, which make the increase or the magnification of sound their main or primary purpose.

Recently His Excellency the Governor, Sir Philip Game, aroused public sentiment against the desecration of trees with advertisements and ugly signs. To arouse the conscience of the people—than which no task is more difficult, as the embers of apathy die hard—to get rid of noise which not merely offends our sense of hearing, but is harmful to the health of both body and mind, requires the rising generation to be inculcated with the prayer "Give peace in our time, O Lord."

Noise is a hindrance to progress. Civilization is derived from *quies*—rest or quiet. Owing to mass production, there will be less need for labour, and

consequently there should be more ease, harmony, rest and quiet. Instead, however, we have unrest, discord and "dis-ease" associated with noise.

Unless civilization can slough off this foul excrescence, noise, by science showing us how we can eliminate this by-product, we will miss the elysium of the millennium.

EFFECTS OF NOISE ON THE NERVOUS SYSTEM.[1]

By CHARLES WARREN, M.R.C.S. (England), L.R.C.P. (London),
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As an otologist I must be pardoned for saying that the hearing apparatus is the most delicate, not to say the most abused, of all the very complicated parts of the machine which go to make up the human nervous system.

The Anatomy of the Auditory Apparatus.

Let us consider briefly the hearing apparatus as a whole. First, there is the external ear, shaped to collect the sound waves and carry them along the canal to the tympanic membrane. Then there is the small portion of cartilage in front of the ear, whose principal function is to prevent the deflected sound waves from being lost. Next, let us observe the direction and curves in the external meatus, which serve the purpose of diminishing the risk of damage which otherwise would occur from the direct impact of violent sounds or air waves acting upon it through the chain of ossicles. In addition, the canal is provided with hairs, and its lining secretes a substance which protects the tympanum by arresting the ingress of foreign bodies and insects. The tympanic membrane is kept in its normal position by the equalization of air pressure through the Eustachian tube, which is lined with ciliated epithelium to prevent the passage of foreign bodies to the middle ear. The delicate chain of bones attached at one extremity to the tympanum and the other to the aural window are capable of the finest movements. I will not weary you with the anatomy of the temporal bone or the inner ear, because the means by which sound reaches the brain are well known to you all; but I think I have gone far enough into the anatomy of the parts to show you how jealously Nature has guarded the reception and substance of the sound waves.

The Harmful Effects of Noise.

Now let us consider the normal conditions under which we are supposed to live, and the conditions under which we actually do live, and consider the effects of these latter conditions, first, upon the hearing apparatus, and secondly upon the nervous and bodily system as a whole.

[1] Read at a meeting of the Sections of Neurology and Psychiatry, Hygiene and Preventive Medicine, and Oto-Rhino-Laryngology, of the New South Wales Branch of the British Medical Association, on August 14, 1931.

Primitive man lived in the forests, hunted for his food, and went to sleep soon after sundown, and so enjoyed periods of absolute quiet. The sounds he heard were well within the compass of his hearing and were not continuous. At the present time he is subjected to sounds and noises of various intensities all day and most of the night, with little, if any, cessation. These sounds vary as do the colours in the rainbow.

May I use a simile? Suppose a person were kept in a darkened room for hours daily and then subjected to strong lights of various shades and intensity. It is easy to imagine the resultant headaches and subsequent nervous breakdown and blindness. Yet the ear is practically subjected to similar conditions every day in the year, save, of course, that sound, and not light, is the factor involved. But the end-results are practically the same. Substitute deafness for blindness and the resultant nervous conditions are similar.

Years ago town dwellers could seek relaxation in the evening by enjoying the quiet of home life; but all this has passed. The wireless, with its occasional discordant sounds resembling machine gun fire, makes a quiet evening a thing of the past. Amusements, too, have altered considerably. Previously the delicate music of the waltz, or the operas, which were restful, have given way to the awful conglomeration of noises known as the "jazz." The silent pictures, which also gave a restful evening and at times induced a peaceful sleep, have succumbed to the ghastly Wurlitzer organ and the blatant "talkies." These are disturbances after the day's work, when the ear requires rest.

The previous speakers have told you of the various noises, preventible and otherwise, with which the ear is assailed during the day time, so I will not dwell upon this part of the subject. What I have to say concerns the effect of these noises upon the ear and the hearing apparatus, and the nervous system.

Continuous noise produces thickening of the tympanic membrane, with loss of movement; ankylosis of the ossicles, with loss of movement; thickening and loss of mobility of the cartilage around the aural window; exhaustion of the auditory nerve. All or any of these conditions tend in the end to produce deafness.

Recently I had a patient, a man about forty years of age, who complained of deafness, tinnitus and loss of sleep. He worked in a factory with noisy machines all round him. His drum membranes were thickened and his hearing power was considerably reduced. After inflation and massage of the drum he improved, but not until I persuaded him to plug both ears with cotton wool immediately he entered the factory and remove the plugs when he got outside.

In a recent work, called "City Noise," published by the City Health Department of New York, this matter has been fully gone into from all points of view. I may be pardoned if I quote from the work, for I consider it embraces every possible consideration and leaves little to be added.

The continual pressure of strident sounds to which people are subjected, tends to produce impairment of hearing and induce harmful strain upon the nervous system leading to neurasthenia.

Street noises are most injurious because they are non-rhythmical and the ear cannot be adjusted to them or may cause tensions generating angry emotions. It is also believed that neuroses may be attributable to noises just as in the case of shell shock.

Wittmark has proved that some auditory organs are completely destroyed by prolonged exposure to loud noises. He sees in this the positive development of deafness, which often begins with an inability to distinctly recognize tones.

Another writer states: Occupational deafness is well known, and as our cities become noisier there will be more occupational deafness among printers, bus drivers, road menders and traffic policemen.

I have shown that the ear is very adaptable, provided the sounds maintain a more or less uniform level, and that the construction is very delicate. City noises give the auditory apparatus no rest, consequently the muscles of accommodation fail to react. This lack of function leaves a breach in the protection of the ear and opens the way for occupational deafness. In New York, taxi-cab drivers are becoming hard of hearing, just like boiler-makers.

Noise has an effect upon the brain. Morphine and nitroglycerine are known to raise the blood pressure in the brain more than any other drugs; yet experiment has proved that the bursting of a paper bag raised the blood pressure more than either of these drugs, and four times the normal, for seven seconds, and that it did not return for thirty seconds; in addition, there were increased pulse rate and irregular action of the heart.

Conclusion.

In conclusion, I think I have shown that noise is responsible for: (i) impairment of hearing, leading to deafness; (ii) impairment in the efficiency of the worker and his powers of concentration on his work; (iii) strain upon the nervous system, leading to loss of sleep and neurasthenia.

THE PSYCHOLOGICAL EFFECTS OF NOISE.[1]

By DONALD FRASER, M.A. (Aberdeen), M.B., Ch.M. (Sydney), *Sydney*.

I HAVE been asked to say a few words upon the psychological effects of noise. It is rather a difficult thing to do. The body and the mind—the soma and the psyche—are so mysteriously linked together that one is very apt to pass unawares from psychology to physiology and *vice versa*. For instance, nearly all that passes as experimental psychology is in reality experimental physiology. You cannot place a manometer on human fear and measure it, nor can you weigh in a balance one single example by anxiety.

[1] Read at a meeting of the Sections of Neurology and Psychiatry, Hygiene and Preventive Medicine, and Oto-Rhino-Laryngology, of the New South Wales Branch of the British Medical Association, on August 14, 1931.

One of the questions I have for some time been interested in is the effect of noise upon the psyche—the specific response of the mind *per se* to the external stimulus of noise. Where shall we look for evidence? I have not been able to gather much from laboratory findings. So that perhaps I may only be able to suggest thought. If I can do that, I shall rest content.

I think that most of us have noted that one of the instinctive reactions of the very young child to a loud rasping noise is one of fear. This appears practically at birth, and I have been privileged to observe that it is almost always a note of one particular quality that most readily evokes the emotion of fear.

We hear a great deal today about baby clinics and of the instruction of mothers in the art of feeding. I wonder if there is ever a word dropped as to the possible mental harm continually being done by the racket of the city.

Noise and Primitive Man.

In the existence of primitive man, say, the cave-dweller of old, noise must have played a tremendous part. He relied far more than we do upon his ears. The beasts he preyed upon by day in turn were wont to prey upon him by night. So that the snapping of a twig, the soft pad of a foot, the distant cry of a jackal, any and all filled him first with an emotion of fear; that in turn induced the endocrine secretions, the physiological effects of which you all know. But it was fear, the emotion of fear, that was the first idea associated with any strange noise. When we turn to the ritual and rites of primitive peoples, we cannot but be struck by the part played by noise. When they wished to instil fear, it was to strange sounds they resorted. In the puberty rites of all savages we find that this is so. In the Wonghi tribe of New South Wales, for instance, a part of the rite was the knocking out of a tooth. When the tooth is knocked out, I read, a loud humming noise is heard, which is made with an instrument consisting of a flat piece of wood with serrated edges, which is swung around by means of a piece of string attached to one end. The candidates for initiation were never allowed to see these instruments, or bull-roarers, as they were called. Neither were the women and children. The penalty attached to over-curiosity on a woman's part was death. In the same sort of savage rites in Africa, we are told, when all are assembled, the high priest calls upon the devils. Immediately a hideous roar is heard, which is made by men with bamboo trumpets.

I know you will exonerate me from making any reflexion upon any form of religion of any people; but we find in the psychology of religion a rich storehouse of proofs of the influence of certain kinds of noises upon the individual and the herd mind. The shophar or ram's horn, with its weird note, sounded in most synagogues at the New Year, still lets loose a flood gate of emotion. At the giving of the law on Sinai, more than the thunder and the

lightning, the sounding of the shophar terrified the people. Here, too, women and children were not allowed to hear it. It was never used on burial occasions, but as an alarm, or in the terrible rite of excommunication. And so we read in Amos: "Shall a trumpet be sounded in the city and the people be not afraid"; and of the call to judgement "in a moment, in the twinkling of an eye at the last trump."

It would be strange indeed if primitive peoples, who themselves reacted with an emotion of fear to certain sounds, did not make use of these same kinds of sound to scare their enemies, and so we find the shophar and many such instruments used as weapons of offence. In demonology people believed, and many still believe, that what scared the life out of them would even put devils to flight. In the Bacchanalian rites, bells and cymbals were sounded. The Chinese still beat tom toms and rattle chains. Even our church bells had their origin in this belief. Sydney must be as free of demons as Ireland is said to be of snakes.

The Ill-Effects of Noise.

The natural result of fear is flight. If one could take to his heels as in the days of old, little or no harm would be done, but in these terrible streets of ours, when a Klaxon roars or a tire bursts, all we can do is to jump for our lives. We have to repress the natural tendency to fly. The clangour and the clamour of the streets of Sydney would have driven the puberty initiation candidates clean crazy, and the shophar would be as a tin whistle to our accursed Pitt Street loud speakers. And just because we seem to take all this as a matter of course, and because there is no by-law in Sydney against noise at any time and in any place, we think that, after all, there is no harm being done. But we cannot break the threads that bind us to the past as easily as all that. In the subconscious mind of every one of us there are the associated fears and memories of the past.

I pass over the havoc played by insomnia. I will not dwell upon the inefficiency caused by the rattling wheels of factory life. It is strange how easily we seemingly become used to them. It is when the engines stop that passengers at sea awake. As the old law says, "a change of impression is necessary to consciousness," but it is to these sudden strident and terrifying noises of our cities that I would call your attention. They, I believe, are causing untold human wreckage.

According to a cabled report, Dr. Leonard Lockhart, in an address delivered before the British Medical Association annual meeting last month, said that during the last decade there had been an almost inexplicable increase of sickness among insured persons—an increase of 109%. It was impossible to believe that the physical condition of the population had deteriorated at this alarming pace. The explanation was that increased sickness was largely psychological. I think somehow that the same is true of Sydney. As I have said before, we cannot fly from the terrible noises of our city in the ordinary natural way; but we fly in a more insidious and dangerous way. We often solve our difficulties by a flight from reality. We employ a psychic mechanism that is often the beginning of the neurosis, the psycho-neurosis and all the rest of it, with which we are only too familiar.

Freud says that there is a fundamental tendency in the mind to suppress every experience that is associated with a painful emotion. Professor Bain, well nigh sixty years ago, said, in his law of conservation: "A pleasant experience exalts the vitality and tends to remain in memory, while painful experiences depress the vitality and tend to disappear." But if it disappears from conscious memory, it does not cease to exist. The lumber rooms of our subconscious mind are chock-full of the painful experiences of the past, and they are added to day and night by the clamour and the clangour of our city life. Many a poor devil cannot stand up to it; he flies from reality by means of dope, by phantasy formation, by the adoption of a hundred and one fears, imperative ideas, anxiety states, and all the rest of it, which we meet every day. Mayhap he takes the greatest flight of all into the dreamland of dementia.

The lineal descendants of the wielders of the bull-roarers of old, to be found in Macquarie Street (I mean on the eastern side), have got us all down through anxiety and fear. They tell us there are upwards of 300,000 unemployed. I fear it is worse than that. I fear that a large percentage of them are unemployable. I believe they are a measure, if you like, of the damage done to the mind by the rattle and roar of the city, and if we cannot remove the cause from them, I hope something will soon be done to remove them from the cause and get them back to the glorious wide spaces of the country, where the call of the mopoke is the only sound likely to disturb their slumbers.

Reports of Cases.

SOME INTERESTING THROAT CASES.

By LIONEL LOCKWOOD, M.D. (Melbourne),
Surgeon Lieutenant Commander,
Royal Australian Navy.

THE following three clinical reports are those of cases which have occurred in the Royal Australian Navy, and may prove of sufficient interest to readers. They illustrate an outstanding similarity from certain points of view, yet in each case the causative condition was entirely different.

Gumma of the Tonsil.

A.B.C., aged twenty-five years, came under observation on August 27, 1930, with an ulcer of his left tonsil covering the whole of the tonsillar area and also involving the posterior pillar. The tonsillar tissue had been almost destroyed by the ulcerative process, and the ulcer was covered with a dirty greyish yellow slough. Considering the size of the ulcer, there was comparatively little dysphagia. Glandular enlargement of the corresponding

cervical glands was of slight degree only, and they were not tender. There was a slight evening rise of temperature, averaging 37·3° C. (99·2° F.). The condition was provisionally diagnosed as Vincent's angina, and the appropriate treatment given. However, the usual response did not take place, so that the diagnosis was doubted. Moreover, the organisms of Vincent's angina were not found on repeated bacteriological examination. Tubercle bacilli were searched for, but not found. A Wassermann test made on September 3, 1930, returned a "++" reaction. A course of "Novarsenobillon" treatment was instituted, ten biweekly injections of 0·45 gramme being given. This was followed by a "Bicreol" course. From the beginning of this treatment the ulcer steadily began to improve.

On investigating this man's history, he had gonorrhœa in 1924, "tonsillitis" and "Vincent's angina" in 1926, and "tonsillitis" again in 1928. The question is whether these diagnoses were correct, and if he had not a slowly ulcerating syphilitic condition all the time. Quervain[1] states that "Vincent's angina in the ulcerative stage may be easily mistaken for a syphilitic ulcer. The bacteriological findings and rapid recovery are decisive." In this case there were no bacteriological findings of Vincent's angina, the condition did not respond to the invariably specific Vincent's treatment, and the Wassermann reaction was "++," this being confirmed on two occasions. The other systems of the patient were perfectly normal. On further interrogating him, he said that he had had a sore throat more or less continuously for four years, with the above diagnoses. One of the methods of treatment was dabbing the ulcer with "Novarsenobillon" powder. This would undoubtedly cause a temporary improvement, but the ulcerative process had steadily progressed. The patient fortunately had a good resistance. Half way through the course of bismuth treatment the ulcer had completely healed and with further arsenical treatment the Wassermann test failed to yield a reaction.

Tuberculosis of the Fauces.

D.E.F., petty officer, aged thirty-four years, first came under notice on October 28, 1929, having developed, while serving at sea, a persistent condition of the left tonsillar region. The ulcer had been present for about one month. It was provisionally diagnosed as Vincent's angina and treated accordingly, but, instead of improving, the condition became worse. The condition consisted of numerous shallow ulcers with a yellowish base and ragged edges on soft palate, anterior pillar of fauces, and left tonsil. There was intense pain on swallowing, particularly on taking food. Even fluids were difficult to take. He had lost 10·3 kilograms (twenty-three pounds) in weight, most of which had been lost in the last ten weeks, before which he felt quite well. He had never had any cough, nor was he subject to colds. His wife had had "chest trouble," and he has one child, a boy aged eleven years, who had enlarged cervical glands. Within the next few days he developed a cough, with a small amount of sputum. His throat gave him a choking feeling, with difficulty in breathing at night. This was due to œdematous swelling of soft palate and uvula surrounding the ulcerated area.

Subsequently tubercle bacilli were found in both sputum and smear from the throat. On examination of the chest there was dulness at the right apex, with increase in vocal resonance and a narrowing of König's isthmus at the left apex. X ray examination of the chest showed miliary tuberculosis of both lungs extending from apices to bases. The Wassermann test gave no reaction on several occasions. The patient's voice became husky and his faucial condition became worse, the ulceration on December 16, 1929, extending over a large area of soft palate. The temperature swung between 37·2° and 38·9° C. (99° and 102° F.), and the cough became more troublesome. He lost more weight. Steadily going down hill, the patient died towards the end of January, 1930.

The first sign of his illness was the throat condition, and it is interesting to realize that six months before his death the patient felt perfectly well, though it is quite possible that the miliary tuberculosis of both lungs had been present unnoticed for some time previously.

Price[2] states that "tuberculous disease of the pharynx is a rare affection; it occurs as a late and terminal complication of advanced consumption. The onset is acute; the affected parts, especially the soft palate and the faucial pillars, are covered with numerous tiny grey tubercles on a bright red mucosa, which soon break down to form multiple superficial ulcers with a flat greyish yellow base. Pain is intense and swallowing becomes well nigh impossible."

Vincent's Angina.

A large number of cases of Vincent's angina are seen in the Royal Australian Navy. The lesions are almost constantly present in the tonsils, and it is noted particularly that there is a close association between ulcerative gingivitis and the tonsillar lesions. The lesion of the gums in a large percentage of cases precedes the tonsillar lesion. Unless the gingivitis lesion be properly treated, the Vincent's condition is almost certain to recur. As is well known, Vincent's angina is caused by two organisms, (*a*) a fusiform bacillus and (*b*) a fine spirochæte. These two organisms occur in varying proportions. The greater the proportion of spirochætes, the greater the depth of the ulceration; and the greater the number of fusiform bacilli, the more does the lesion tend to be superficial.

An interesting case of Vincent's angina was that of H.K., telegraphist, aged twenty. He was observed on August 20, 1930, in his fourth attack of Vincent's angina, the lesion being a deep ulceration of both tonsils, the ulcers being covered with a greyish exudate. As is usual, there was considerable dysphagia. This was his fourth attack in ten months. Bacteriological examination revealed the typical organisms. He was put on routine treatment, namely, a hydrogen peroxide gargle to clear away as much exudate as possible, then a gargle with perchloride of mercury one in 2,000, and, lastly, painting with Fowler's solution, all three times daily. Under this treatment the condition gradually cleared. It was found that he had ulcerative gingivitis; this was cleared up with 10% chromic acid and *liquor arsenicalis* paintings alternately, each once a day. Since then he has been entirely free from any trouble. The Wassermann test gave no reaction.

Comment.

The lessons to be learned from these cases appear to me to be:

1. The great importance in all cases of throat infections which persist more than a few days, of having a clinical and X ray examination of the lungs, a bacteriological examination of the throat lesion, and a blood examination. In the cases of A.B.C. and D.E.F., such examination would have elicited the correct diagnosis at a considerably earlier date.
2. The importance of pain and dysphagia in the differential diagnosis.
3. The way in which the patient's previous history is apt to lead to wrong conclusions, or rather to obscure the true diagnosis. In A.B.C.'s case there was no history of primary syphilis, and in D.E.F.'s case no history suggesting tuberculosis of the lung.
4. If local arsenical treatment does not improve the throat condition in a week it is almost certainly not a Vincent's angina.
5. The clinical signs in all three cases quoted were very much alike, at any rate in the early stages, and on the clinical signs alone it would have been very difficult, in fact impossible, to have correctly diagnosed them.

References.

(1) Quervain: "Surgical Diagnosis."
(2) Price: "A Text Book of the Practice of Medicine."

AN UNUSUAL CASE OF TORSION OF THE OMENTUM.

By THEODORE AMBROSE, M.B., Ch.M. (Sydney), F.R.A.C.S.,
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THE patient, a male, aged sixty-four, developed sudden severe pain under the right costal margin while lying in

bed. There was no vomiting and the action of the bowels had been regular. As the pain persisted, the patient presented himself for examination two days after the onset.

There was no apparent distress, the tongue was moist and slightly coated. The patient was on the stout side; the abdomen, though full, was soft. The only tenderness to be found was under the right costal margin, extending from just to the right of the mid-line to well over towards the loin. The tenderness was increased on deep expiration, but no mass was palpable. There was no tenderness in the renal region, and the urine was normal. The temperature and pulse were normal. A tentative diagnosis of subacute cholecystitis was made and the patient was sent to hospital.

His condition remained much the same for two days. On the day after admission to hospital the temperature rose to 37·8° C. (100° F.) in the evening, but on the following morning was normal again. On the second day after admission the patient felt rather better; there was still no distension or rigidity of the abdomen, but the pain and tenderness persisted.

Operation was advised and was performed on the fifth day after the onset of the trouble. An upper right rectus incision was employed. On opening the abdomen, blood-stained fluid at once escaped. It was discovered that the omentum was tightly twisted and a large portion was spread fan-shaped over the upper surface of the liver, the terminal portion being adherent, high up, to the dome of the diaphragm. The strangled portion of omentum was very indurated and cake-like, purplish in colour, with threatening gangrene. It was stripped off the diaphragm with little difficulty. The unhealthy portion, as well as a large amount of healthy but superfluous omentum, was removed. A large, dilated, thick-walled gall-bladder showing chronic cholecystitis was also removed at the operation. The convalescence was uneventful.

It was practically impossible to diagnose the condition found at operation before opening the abdomen. Such a condition must be extremely rare. How the omentum came to be sandwiched between the liver and diaphragm after being twisted must remain a mystery. The patient had not indulged in gymnastics of any sort and could throw no light on the causation. The large gall-bladder showed only chronic inflammation and there was no adhesion of the omentum to the gall-bladder.

A CASE OF POISONING FROM HAIR DYE (PARAPHENYLENEDIAMINE).

By W. JOHN CLOSE, M.B., M.S. (Adelaide), F.R.C.S. (Edinburgh), F.R.A.C.S.,
Adelaide.

I FEEL impelled to give this case all the prominence possible, since the chemical involved is one in fairly common use, and protection by legislation is given in only one Australian State; in addition, the difficulties of diagnosis, as I found in this case, may be very real if the toxin is not thought of.

The patient, a hotel proprietress, but a teetotaller, and a widow for about fifteen years, aged forty-eight years, consulted me first on November 30, 1929. She had been suffering from a subacute colitis for a week, headaches and giddiness frequently for several years, buzzing noises in the ears, "electricity" running from finger tips to toes. Bowel disturbances such as the present one had been common, but milder, flatulence frequent, and sleeplessness the rule. All the symptoms, including the attacks of colitis, seemed to be getting worse.

Twelve months before, she had consulted another doctor, who had diagnosed "blood pressure" (said to have been over 200 millimetres of mercury), and cessation of work was recommended. This advice had been followed for a short time only.

Her menstrual history was that the menses were regular to the day, the intervals were twenty-eight days and each period lasted for two to five days. There was no particular discomfort, except that the headaches and giddiness were increased at that time. The patient had no children, but had had two miscarriages, said to have been due to a "twisted womb." The previous history was otherwise good.

On examination, the patient was a well nourished woman. Tenderness was present along the colon, the motions were loose and mucoid, becoming normal quickly with appropriate treatment.

The patient was seen at intervals during the next month; the heart, lungs and blood pressure showed no abnormality, the latter varying between 135 and 155 millimetres of mercury systolic and 90 and 110 diastolic, and since then it had not been found higher.

The eyes showed a slight movement during straight forward vision; the movement was less when the patient looked to either side; I did not consider the condition a nystagmus. Rombergism was slight, but no other neurological signs were present. The urinary system was satisfactory, the results of dilution and concentration tests being normal. The Wassermann test gave no reaction.

Vaginal examination, confirmed under anæsthesia in consultation with a gynæcologist, showed the cervix to be low, pointing downwards and slightly forwards, with the body posteriorly, globular and tense, the size of a cricket ball, and not replaceable in anteversion. No sign of infection of the cervix or external genitals was found. The gynæcologist suggested that possibly the symptoms were due to commencing menopause, with some chronic adnexal inflammation; this seemed to be confirmed by a tenderness which persisted in the left iliac fossa after the examination.

Intrapelvic diathermy with sexual hormone therapy was advised; this was carried out for one month and was repeated after two months; the symptoms temporarily retrogressed.

The patient took a hotel in the country and I did not see her again for twelve months.

On July 23, 1931, I saw her again in bed; she affirmed that she had spent the greater part of her time in bed since being last seen, not leaving it for two to three weeks at a time. Headaches had been and were now very severe; large doses of morphine, administered by her doctor, had been quite ineffective. When the headaches were most severe, vomiting occurred, especially when the patient changed position to the upright, or sometimes even when turning in bed. Intense giddiness was present, even when the patient turned her head to the left, while lying in bed. The left side of the body ached and would become numb, even including the leg; "electric" symptoms were more troublesome. The patient was becoming thinner, she had no appetite, and intestinal symptoms, such as flatulence *et cetera*, were recurring occasionally.

On examination the patient was lying on her right side, the head and eyes being turned to the right; she resented being turned to the left. The pupils were equal and active, neither dilated nor contracted. The movements of the eyeballs were much more marked, and were considered by me to be a definite nystagmus with slow component to the right. Spontaneous deviation of the left hand was present, but past pointing was neither definite nor constant.

Ataxia of the legs could not be elicited, but later was not marked, though there was definite Rombergism. No other ataxic phenomena, such as asynergism, adiadokokinesis, defects in speech *et cetera*, were found. There was no tremor, no hypotonia, and no alteration in deep or superficial reflexes.

Examination of sensation revealed slight impairment only to pin prick on the inner side of the left foot. The neck muscles were not rigid, though passive movement of the head caused pain in the head.

The patient was observed in hospital for three weeks, where she lay constantly with head and eyes turned to the right. She vomited on several occasions, when the headache and giddiness were at their worst. None of the analgesic drugs used influenced the headache appreciably.

A plain skiagram of the skull revealed no abnormality.

Examination of the fundi and fields by Dr. A. L. Tostevin revealed no abnormality.

Vestibular tests were made by Dr. R. H. Pulleine. He found that the reactions to the thermal and rotation tests

were typical of a toxæmia of the labyrinth. He denied the nystagmus as being too slow and controlled to some extent by volition.

Casting around for some toxin and thinking of a metallic poison, my attention was directed to her obviously dyed hair (black), a fact which was admitted only after pressure, and the name of the particular preparation, "Inecto," obtained.

Investigation showed that the makers guaranteed freedom from lead, silver, copper and mercury. Martindale (1928) describes the mode of preparation by reduction with tin and hydrochloric acid, so the presence of tin was investi- and hydrochloric acid, so the presence of tin was investigated. The Department of Chemistry reported an absence of tin in the dye, so that if this preparation were the cause, it would be the aniline, paraphenylenediamine, which was responsible.

A warning is issued by Inecto, Limited, to try first a small quantity of dye behind the ear, to test one's sensitiveness, and to avoid local reactions. It transpired that the patient's brother had been so sensitive that the dye caused a marked swelling of the head after the first application.

The literature gives details of several cases in which legal proceedings have been instituted, damages in one case[1] amounting to £200 pounds, and in another[2] to £500 *plus* special damages. In the latter it was shown that there was neglect in reading the company's warning directions, but the magistrate held that this did not exonerate the company.

A. Gautier[3] states that the symptoms can be divided into three groups: (i) Toxic skin eruptions—eczema and urticaria—with great burning and itching; (ii) gastro-intestinal symptoms, such as nausea; (iii) nervous symptoms, such as sleeplessness, dizziness, weakness of legs, epileptic attacks and syncope. He states that death has resulted in some cases.

Cases have been reported[4] in which a retrobulbar neuritis with impairment of central vision and a central scotoma for red and green have been seen.

As my patient presented symptoms falling under the second and third groups of Gautier, I immediately ordered her to have her head shaved. From that very day her headache disappeared and has not returned for three months; the giddiness has also disappeared, paræsthesia is negligible, she sleeps well and one mild attack of colitis only has supervened.

On examination there is now no Rombergism, no movements of her eyeballs are present, nor are other objective signs of her trouble to be found. There remains, however, a dark pigmentation round the alæ of the nose, and when she is caught without her "make-up," the pigmentation is seen to be much more extensive. I had not mentioned this in my notes, although she had expressed great distress on its account, because I did not associate it with the trouble. It seems very likely, however, that it is due to the dye, the distribution being similar to the bronze pigmentation in the chronic copper poisoning of brass workers.

Martindale states that in nearly every European country and New York the use of paraphenylenediamine as a basis for hair dyes is prohibited and that the Victoria Pharmacy Board (Australia) has added it with similar irritant bases to Part II of the third schedule of the *Poisons Act*.

From the point of view of diagnosis, the most serious condition to differentiate was a subtentorial tumour. In the absence of typical ataxic signs and the early remissions it did not look like a cerebellar lesion, but a cerebello-pontine tumour was hard to exclude, and would have been much more difficult if a swollen disc had been found; indeed, an exploration of the posterior fossa is not beyond the bounds of imagination, if both optic and vestibular nerves were found affected together.

References.

(1) Medical News (Editorial), *The British Medical Journal*, Volume I. 1922, page 373.
(2) "Medicine and the Law" (Editorial), *The Lancet*, Volume I, 1926, page 1058.
(3) "Poisonous Hair Washes" (Editorial), *The British Medical Journal*, Volume II, 1909, page 812.
(4) E. Berger: "Visual Disturbances Due to the Use of Hair Dye Containing Anilin," *Archives of Ophthalmology*, Volume XXXVIII, 1909, page 397.

Reviews.

RADIUM THERAPY.

HECTOR COLWELL has written a very useful book, which is adequately described by its title: "Notes on Radium Therapy for Medical Students."[1] It consists of 162 pages of concise facts that ought to be read by every student before his final examination.

He describes very fully the various methods of radium technique and how they are applied to carcinoma of the breast, rectum, cervix, urinary bladder, rodent ulcer and skin carcinoma. His information on the clinical side is at times a little out of date; and too much stress is laid on English methods and not enough on the excellent technique and the results shown in some of the Continental clinics.

The best and most useful chapters are those dealing with the physics of radium and the various ways in which the salt and emanation are applied clinically in the form of plates, needles, tubes and seeds. There is also an excellent chapter dealing with the protection necessary for doctors and nurses handling this powerful agent.

The work is an excellent text book for all students and recent graduates, who, even though they are not practising radium therapy, ought to know its general principle.

Notes on Books, Current Journals and New Appliances.

A BOOK ON AUSTRALIAN BIRDS.

MR. NEVILLE W. CAYLEY'S book, "What Bird is That?", will be welcomed by all bird lovers[2]—and there must be few Australians who are not bird lovers. The book has been sponsored by the Gould League of Bird Lovers of New South Wales. It is divided into several sections: "Australia's Largest Birds", "Forest-Frequenting Birds", "Birds of Heath-Lands and Open Country", "Birds of Lakes, Streams and Swamps", "Birds of the Ocean and Shore". Birds introduced and established in Australia are dealt with in an appendix. The birds are illustrated in beautifully coloured plates and a short description of each bird is given. The book, described in the subtitle as "A Guide to the Birds of Australia", will be most useful as a guide, but it will be more—it will have a definite educational value. The plates make the book what it is and cannot be too highly praised; the blocks have been carefully prepared and the machining has been beyond reproach. This book will surely have a wide sale.

THE AUSTRALIAN AND NEW ZEALAND JOURNAL OF SURGERY.

THE December, 1931, issue of *The Australian and New Zealand Journal of Surgery* has been published. This issue contains several articles of interest to general practitioners. C. P. G. Wakeley and M. A. Paul contribute an article on tumours of the small intestine; it is illustrated by clinical reports. Alan Newton analyses 995 cases of acute appendicitis treated at the Melbourne Hospital, and J. R. Anderson deals with some problems of strabismus. A new section of the journal is devoted to surgery in other countries. In this column there appear abstracts of articles from foreign journals which are not readily accessible to Australian practitioners; this column should prove most valuable. In this issue of the journal is included a reproduction of a pencil drawing of the late R. Gordon Craig, by Lambert.

[1] "Notes on Radium Therapy for Medical Students," by H. A. Colwell, M.B., Ph.D., M.R.C.P., D.P.H.; 1931. London: H. K. Lewis. Crown 8vo., pp. 175, with 15 illustrations. Price: 6s. net.

[2] "What Bird is That? A Guide to the Birds of Australia," by N. W. Cayley; 1931. Australia: Angus and Robertson. Royal 8vo., pp. 338, with coloured plates. Price: 12s. 6d. net.

The Medical Journal of Australia

SATURDAY, JANUARY 9, 1932.

All articles submitted for publication in this journal should be typed with double or treble spacing. Carbon copies should not be sent. Authors are requested to avoid the use of abbreviations and not to underline either words or phrases.

References to articles and books should be carefully checked. In a reference the following information should be given without abbreviation: Initials of author, surname of author, full title of article, name of journal, volume, full date (month, day and year), number of the first page of the article. If a reference is made to an abstract of a paper, the name of the original journal, together with that of the journal in which the abstract has appeared, should be given with full date in each instance.

Authors who are not accustomed to preparing drawings or photographic prints for reproduction, are invited to seek the advice of the Editor.

THE POLIOMYELITIS DANGER.

In the issue of December 19, 1931, two notices were published, one from the Infantile Paralysis Committee of New South Wales and the other from the Poliomyelitis Committee of Victoria. Both call for special emphasis. A considerable increase in the number of poliomyelitis infections is taking place and the call is for watchfulness, careful examination and readiness to institute proper treatment. It should not be necessary to write more than this. Most medical practitioners, if required, could probably give a complete account of the symptomatology, if not of the pathology, of the condition. Poliomyelitis, when not recognized and treated in the early stages, is, however, fraught with such dire and lasting results that the main facts must be stated in this place. They are these: The disease makes its appearance as an acute infective disturbance. There is a definite pre-paralytic stage. The pre-paralytic stage can be recognized. The administration of serum from convalescent patients during the pre-paralytic stage will prevent the onset of paralysis. Serum is available for the use of medical practitioners. Destruction of the anterior horn cells of the spinal cord makes recovery of the paralysed muscles impossible.

Enumeration of these facts makes it clear that the whole question, as far as the medical practitioner is concerned, resolves itself into one of diagnosis—diagnosis of the pre-paralytic stage. The medical practitioner is, of course, not the only person concerned—he cannot make a diagnosis until he sees the patient. The general public must be taught that feverish attacks in children must not be treated lightly, but that medical advice should be sought. Unfortunately, at the present time may parents, fearful of incurring expense, are chary of sending for the medical attendant. It is satisfactory, however, to note that the daily Press has given prominence to the increased incidence of poliomyelitis and people at least know that there is a danger of their children being infected. In regard to diagnosis by the medical practitioner, there should be no real difficulty. Certain practitioners, and some of them sound clinicians, have expressed doubt as to the possibility of recognizing the pre-paralytic stage of the disease. To such we would commend several articles that have appeared in this journal: Dr. Jean Macnamara wrote on the diagnosis of poliomyelitis in the issue of March 28, 1931; Dr. Karen Helms wrote on the early diagnosis and serum treatment, and Dr. E. H. M. Stephen on clinical types of the disease in the issue of January 17, 1931. These articles contain all that is required for a proper understanding of the symptomatology and differential diagnosis. It is above all important to look on the disease as "a general systemic infection, accompanied or followed by a myelo-encephalitis with meningeal complications". Any part or even the whole of the central nervous system may be affected and symptoms and signs may therefore be most diverse. As the Poliomyelitis Committee of New South Wales points out in its notice, the symptoms usually manifested have been: vomiting, anorexia, feverishness, retention of urine, irritability, twitching, headache, backache, stiffness of neck or back, followed by paresis or paralysis.

The committees in Victoria and New South Wales have done most important work in collecting serum.

It rests with general practitioners to make this work effective. Their task is not easy, for in no disease in the whole gamut of human suffering does so much depend on the vigilance and insight of the medical attendant. If any doubt should arise in his mind, or if he should feel that he is not competent to make a diagnosis, he should without delay seek the assistance of someone who has studied the subject and is able to help him. There must be no temporizing and no uncertainty.

Current Comment.

THE TOXICOLOGY OF THALLIUM ACETATE.

ABOUT twenty years ago Sabouraud introduced a 1% thallium acetate ointment for the treatment of ringworm of the scalp and emphasized its toxicity. Extensive use of an ointment of greater strength than this is fraught with danger. Morris Gleich has reported two deaths from thallium acetate poisoning.[1] In 1930 fourteen children died of thallium acetate poisoning in Spain. Two days after its internal administration for ringworm of the scalp they exhibited symptoms of myelo-encephalitis or acute respiratory disorder. The therapeutic (epilatory) is very close to the lethal dose. The oral method is regarded as the most suitable. When given by other routes the drug may evoke toxic symptoms. Buschke caused alopecia in rabbits, mice and guinea-pigs in fourteen days by thallium acetate. On the eighteenth day all the animals died with increasing stupor and evidence of enteritis. Thallium acetate inhibits metamorphosis and development of tadpoles, prevents the growth of rats, and causes bony changes resembling those of rickets, together with diminished sexual activity, atrophy of the testicles and cataract.

In man thallium produces folliculitis and a toxic hæmorrhagic eruption with petechiæ and ecchymoses resembling those caused by bismuth and mercury; also gingivitis, stomatitis (even ulcerative) and a form of angina. There may be herpes, rhagades on the lips and severe abdominal pains and diarrhœa. The gastro-intestinal mucosa may be hæmorrhagic, or desquamative or ulcerative colitis may occur. Hæmorrhage and necrosis of the liver and nephritis may also result. Polyneuritis has been recorded and also choreiform movements and vascular disturbances, including cerebral hæmorrhage. The joints become painful, tender and swollen. Other manifestations are pyrexia, achlorhydria, secondary anæmia, lymphocytosis and eosinophilia. Gleich's two patients were boys aged seven and five years. Both had myelo-encephalitis, and the younger displayed marked respiratory symptoms. Both exhibited toxic manifestations two days after oral administration and died within twelve days. The elder one, within two days, could neither walk, talk, nor swallow. He was drowsy, with swollen face and retracted head. Convulsions and jactitating movements occurred before death, but consciousness was regained for a short time. The younger child developed a cough with a temperature of 38·3° C. (101° F.) in forty-eight hours. Six days later there was consolidation of the left lower lobe. Later there was pneumonia with pulmonary œdema at both bases.

Gleich concludes by stating that, since there are other successful methods of treating ringworm of the scalp, and since the therapeutic dose of thallium acetate is so close to the limit of the fatal dose, the use of thallium acetate should be abolished. One might go further and say that in view of the sinister possibilities, treatment of ringworm of the scalp by thallium is almost as unhappy a measure as burning down a house to destroy cockroaches. The Prussian Ministry of Health has added thallium to the list of dangerous chemicals. Thallium salts are being extracted in increasing amount from sulphur and lead residues for therapeutic use and in the manufacture of heavy optical glass. In one such chemical factory six employees exhibited toxic symptoms in one week. Several cases of poisoning have occurred in factories where a thallium compound (celiopaste) was used as a rat poison in place of barium.

The precise mode of action of thallium is not yet understood. It has been suggested that it acts on the autonomic nervous system and in small doses stimulates hair growth. Applied locally, it does not produce epilation or any local effect on the blood vessels. It is only after absorption into the system that epilation results. Sabouraud, however, has stated that repeated inunction of an ointment will cause local atrophy of the hair. The drug should not be given to adults, as genital development provokes an endocrine or neurovegetative transformation which increases the sensibility of the organism to its toxic action. G. H. Percival, however, asserts that there is no evidence indicating that the drug acts indirectly through the endocrine sympathetic system; in his opinion, the evidence is against such a view. There is no conclusive evidence indicating direct action of the drug on the hair cells. Thallium is slowly excreted and its action is cumulative. It is unsafe to repeat a dose in less than two or three months. It is also impracticable to give repeated very small doses until the desired effect is produced or warning symptoms appear. When the drug is thus administered, a poisonous amount may be taken before the first sign of trouble becomes evident. Gleich states that animal experiments show that the action is somewhat like that of lead or arsenic, with early involvement of the central nervous system evidenced by atrophy, tremor or paralysis. There may also be changes in the spinal ganglia and peripheral nerves. Degenerative changes are seen in the liver

[1] *The Journal of the American Medical Association*, September 19, 1931.

and kidneys. Metabolism is affected. Bone development is interfered with and there is calcium deficiency which possibly explains the muscle cramps.

Externally applied to rabbits and guinea-pigs as a 5% ointment, thallium acetate caused death in four days. By this method cumulation occurs with small doses. Gloves should be worn when thallium salts are handled. The toxic manifestations of thallium are far more comprehensive than as related by Gleich. Possibly, however, some fatalities may be due in part to associated lead. Symptoms other than those indicated by Gleich are bone pains and muscle pains (myalgia), especially backache. Loss of appetite or complete anorexia may occur or ptyalism. Red and white blood corpuscles may be found in the urine. There may be irritability, or lassitude, hyperæsthesia or loss of patellar reflex and partial paralysis. The functions of the bladder and rectum may be disturbed and tachycardia occur. In the eye there may be cataract or iritis, retrobulbar neuritis, central scotoma for red and green and greatly diminished visual acuity. Or there may be optic neuritis followed by permanent atrophy. The alopecia may be attended by intense erythema of the whole scalp.

The drug must be absolutely pure and the dose recommended varies from 7·0 to 8·5 milligrammes per kilogram of naked body weight. The dose in Gleich's cases was eight milligrammes per kilogram. To obviate the dangers it has been advised that half doses should be used together with half doses of X rays. Altogether the method seems so heroic and dangerous that its employment in therapeutics might well be abandoned.

RHEUMATOID ARTHRITIS AND STILL'S DISEASE.

THERE have always been some who have declined to accept the view that Still's disease is a separate clinical entity. They have grounds for their contention. Enlargement of the lymphatic glands and spleen of adults suffering from rheumatoid arthritis is not uncommon, though it is true that usually only those glands nearest the affected joints are involved. The more generalized enlargement of the lymphatic glands of children, and the more pronounced enlargement of the spleen, may be due to a more ready reaction to infection. Rolleston remarks that the joint lesions of Still's disease differ in no way from those of rheumatoid arthritis, and that rheumatoid arthritis of children may occur without any glandular or splenic enlargement, with glandular but no splenic enlargement, or with enlargement of both glands and spleen. Garrod points out that when the glandular hypertrophic changes subside, the disease presents the features of ordinary rheumatoid arthritis. Rupert Waterhouse, in a paper[1] read before the Royal Society of Medicine's Section for the Study of Disease in Children recently, discusses the features common to the two diseases. He quotes Still's original paper: ". . . . This disease has hitherto been called rheumatoid arthritis, but it differs from that disease in adults, clinically in the absence of bony change, even when the disease is well advanced, and in the enlargement of glands and spleen, and pathologically in the absence, even in advanced cases, of the cartilage changes which are found quite early in that disease, and also in the absence of osteophytic change." In Still's day the term "rheumatoid arthritis" was often employed as a synonym for osteo-arthritis; evidently, says Waterhouse, Still was referring to osteo-arthritis. Possibly, if the clinical distinction between atrophic and hypertrophic arthritic changes had been more clearly recognized, Still's paper would never have been written. Waterhouse points out that Still's description of the joint lesions observed *post mortem* is equally applicable to the majority of lesions of rheumatoid arthritis of adults.

Twenty-five years ago, in an investigation of adults suffering from rheumatoid arthritis, Waterhouse found some glandular enlargement in all save 4% of instances; there was considerable glandular enlargement in the upper extremity in 84% and in the lower extremity in 36%. At the same time, he found splenic hypertrophy in only 6%; but McCrae found that 23% of 166 patients examined by him had enlarged spleens.

The pericarditis and slight exophthalmos noted by Still, have both been observed in cases of rheumatoid arthritis of adults. Charcot remarked: ". . . . . I have several times seen the appearance of pericarditis coincide with exacerbation of the joint affection."

Waterhouse goes on to discuss a number of cases; he mentions particularly two patients who had become affected with rheumatoid arthritis at the ages of thirty-five and thirty years respectively, and he remarks that if the age of onset had been five years, it would have been difficult to point to any particular in which they did not conform to the picture painted by Still. He concludes that there is no essential clinical or pathological difference between Still's disease and rheumatoid arthritis, and states that the ætiology of both is equally obscure.

Waterhouse's view is, of course, not a new one, but it appears to be worthy of repetition, especially as he supports it with such convincing argument. It is unfortunate that he does not (or is unable to) draw any analogies between the results of treatment of the two conditions. The focal sepsis theory of causation is implicitly accepted by some, regarded with scepticism by others, and logically employed by a few. There is little doubt that in many instances focal sepsis plays a part, but whether this part is subsidiary is still a matter for conjecture. A comparison between the results of treatment of rheumatoid arthritis and of Still's disease, by various methods, including focal sepsis therapy, would be of interest.

[1] *Proceedings of the Royal Society of Medicine*, October, 1931.

Abstracts from Current Medical Literature.

MEDICINE.

Ætiology of Secondary Anæmia.

R. MAYER LIST (*Klinische Wochenschrift*, June, 13, 1931) gives the histories of five cases of severe secondary anæmia associated with dilatation of the colon. The diagnosis was confirmed by X rays, and other possible causes, such as occult hæmorrhage from carcinoma or syphilis, were excluded. The author considers that the anæmia was produced by absorption of bacterial toxins from the large intestine rather than by the absorption of the end products of food digestion, as no indican was found in the urine. The blood picture varied from one of pernicious anæmia to severe secondary anæmia, and was due apparently to the toxin acting variably on the liver, blood and bone marrow in different cases. The treatment consisted of bowel irrigation with antiseptics, liver extract and iron and arsenic tonics. Blood transfusion was employed in one instance because of the long duration and severity of the anæmia.

Prevention of Measles.

K. G. HEYMANN AND R. BUSSEL (*Deutsche Medizinische Wochenschrift*, May 1, 1931) have investigated the value of injections of adult blood as a prophylactic against the spread of measles, especially in institutions for young children. They used blood from patients who had measles several years previously — generally from sisters who had served in the wards, but were away from such sources of infection. Poor results in the past have generally been due to the smallness of the dose. They recommend twenty cubic centimetres for infants under one year, twenty to thirty cubic centimetres for older children. Accounts of several outbreaks regarded as proving the value of the procedure are given.

Cardiac Infarction and Angina Pectoris.

E. WOLLHEIM (*Deutsche Medizinische Wochenschrift*, April 10, 1931) states that the onset of cardiac infarction is usually a severe attack of angina which may be the first such attack or follow a history of repeated attacks. The most important diagnostic point is the prolongation of the acute symptoms. The necrosis of the heart muscle is shown by the temperature of from 37·3° to 38° C. for about a week. The blood count shows leucocytosis, immature neutrophile cells and an increased sedimentation rate. Pericardial friction was noted in more than half of the cases. Acute dilatation was noted in several others. The pulse remains fast, small and easily compressible. The blood pressure is greatly reduced and the patient is liable to severe collapse. Symptoms of infarcts in the lungs or liver may also be noted. Marked cardiac insufficiency tends to remain permanently. The most dangerous period for the patient is the first ten days, during which the mortality is at least 50%. At autopsy, while occlusion of the left coronary artery is common, involvement of the right artery is not always associated with typical anginal attacks. In many cases there is no coronary thrombosis present, but merely a spasmodic condition. Every patient with angina should be kept in bed and the temperature should be recorded regularly. In the presence of fever, cardiac infarction should be diagnosed. Absolute rest in bed for six to eight weeks is essential. Caffeine and ephedrine are required to combat collapse. Nitroglycerine is given to relieve pain and oppressive feeling in the chest. Morphine is best given in association with lobelin. Digitalis preparations are indicated only in the presence of acute dilatation. Good results follow injections of ten cubic centimetres of a 20% solution of glucose given after the first week.

Syphilis of the Aorta.

H. SCHLESINGER (*Wiener Medizinische Wochenschrift*, March 28, 1931) discusses recent work on syphilitic aortitis. An aortic systolic bruit is generally considered to be a cardinal sign, but it was noted in only 10 out of 21 cases personally observed. The author does not attach great importance to the presence of a systolic bruit in the left subclavian area. In some instances hypertension has been observed, but in general increased arterial tension is not associated with mesaortitis. In his experience cases occur more frequently in females than the statistics generally allow—121 males and 95 females. At least a quarter of the author's syphilitic patients showed specific aortic lesions, and it would appear that the modern methods of treatment had not been successful in preventing such late manifestations. The average age of incidence was between forty and sixty. A bad prognosis can be given in cases developing earlier in life or in those who become first infected at a late period.

Pulmonary Silicosis.

CH. GARIN (*La Presse Médicale*, April 18, 1931) discusses the diagnosis of pulmonary silicosis. He alludes to studies made in South Africa, in Germany and in France. The symptoms and physical signs are identical with those of pulmonary sclerosis of whatever nature. The two essentials for diagnosis are exposure to silica-containing dusts for several years, and the typical radiographic appearances of the lungs with a one-fiftieth of a second exposure. One typical sign is the occurrence in the middle and lower areas of both lungs, of numbers of small clear-cut opaque areas, about the size of a lentil, of granular appearance. These X ray appearances may also occur with tuberculous disease, but in tuberculosis of this nature fever is present and the condition is progressive. The X rays will not, however, differentiate silicotic from tuberculous areas when tuberculosis is superimposed on silicosis. The author maintains that a granular bilateral mottling in the X ray picture will not enable the clinician to declare whether the condition is pure silicosis or silicosis *plus* tuberculosis.

The Treatment of Pernicious Anæmia.

G. R. MINOT AND W. B. CASTLE (*Annals of Internal Medicine*, August, 1931) consider that the medical practitioner should know the potency of the preparation advised in the treatment of pernicious anæmia. A remission may usually be initiated by the daily feeding of 200 to 300 grammes of prepared liver or kidney, active extracts derived from 300 to 600 grammes of liver, 150 to 240 grammes of fresh whole pig stomach, or stomach mucosa or dried and defatted stomach prepared from this amount. Brain is about one-third as potent as liver. Unusually large doses may be necessary because of complications or difficulty of absorption. In the treatment of a patient who is very ill, the entire dose for a week may be given within a few hours or through a stomach tube at one time. The daily maintenance dose varies, in terms of liver extract, from the amount derived from 200 grammes to that derived from 1,200 of liver. The red blood cell count and hæmoglobin value alone should not determine the dose, but should be considered along with the colour index, detailed character of the red cells and white cells and blood platelets, and particularly the patient's symptoms and signs. The size of the cells can be as important a guide to dosage as the red blood cell count. The prescription of a proper diet is obviously desirable. When large doses of potent material fail to restore the blood to normal, iron will often cause distinct improvement. Hydrochloric acid is unnecessary even when there is achlorhydria. Food rich in vitamin *C* is sometimes indicated.

C. C. STURGIS AND R. ISAACS (*Annals of Internal Medicine*, August, 1931) maintain that the essential part of the treatment of pernicious anæmia is to be assured that the patient receives a sufficient amount of potent material which is effective in the treatment of the disease. If desiccated stomach ("Ventriculin") is used, a safe daily dosage is ten grammes for each million deficit in the red blood cell count. If the red blood cell count is one million corpuscles per cubic millimetre, the dosage should be forty grammes a day. After the blood becomes normal, a maintenance dosage

must be continued indefinitely. The precise dosage necessary varies with different patients, but an average is ten grammes a day for five or six days a week, and the patient should report every two or three weeks for blood examination. If the red blood cell count remains at a normal level for over two months, it may be concluded that the dosage is adequate. The authors conclude that the most accurate single criterion of adequacy of dosage is the level of the red blood cells. Though rest in bed may be necessary in serious cases for a week or two, it has been their practice to urge their patients to walk about at the earliest possible moment. The diet should be liberal and well balanced, but otherwise requires no special attention. It is unnecessary to administer dilute hydrochloric acid, iron or arsenic. Acute complicating infection with fever is an indication to increase the dose of desiccated stomach from 50% to 100%. Blood transfusion is a useful emergency measure. Through a stomach tube with semi-rigid walls, 100 grammes or more of desiccated stomach, mixed with sufficient water to insure that it will pass through the tube readily, may be administered every three or four hours in emergency.

Diabetic Coma.

P. A. GRAY AND W. D. SANSUM (*The Journal of the American Medical Association*, July 25, 1931) report the history of a patient suffering with diabetic coma accompanied by severe hyperglycæmia who eventually recovered. The patient was a man, aged fifty-three years. He was admitted to hospital in coma. A typical diabetic history was obtained from a relative. Necrotic lesions exuding pus were seen on both feet. The characteristic phenomena of diabetic coma were present. The blood sugar estimated by the Shaffer method was 0·9% and by the Folin-Malmros method 1%, and the blood cholesterol 222 milligrammes per 100 cubic centimetres. The patient had received no medical treatment prior to admission to hospital. The treatment adopted consisted in the administration of digitalis and caffeine sodiobenzoate hypodermically, the application of heat to the extremities, hypodermoclysis of 1,000 cubic centimetres of normal saline solution and the rectal and intravenous administration of 5% glucose solution in addition to insulin. During the first eight hours the patient was given insulin every fifteen minutes. During this period he received 560 units of insulin, 120 units being given intravenously. Two days after admission, his urine was sugar free and four days later his left leg was amputated under general anæsthesia. At the time the case report was written he was on a diet consisting of 320 grammes of carbohydrate, 60 grammes of protein and 160 grammes of fat. He was receiving 53 units of insulin every day. His urine was sugar free and the fasting blood sugar at the last estimation was 0·236%. The authors conclude by stating that they have found mention of three patients with diabetic coma who have recovered with higher initial blood sugar than that found in this case, the highest (1,680 milligrammes per 100 cubic centimetres) being reported by Curtis and Dixson.

Serum Treatment of Scarlet Fever.

U. FRIEDEMANN, SCHMEREL AND LUKAS (*Deutsche Medizinische Wochenschrift*, May 1, 1931) discuss the advances made in the treatment of scarlet fever with concentrated serum. They have used intraspinal injections of from two to five cubic centimetres in five cases and have observed that the toxic symptoms disappeared within twenty-four hours and the temperature became normal. Late complications and serum sickness, however, were not definitely affected. Although the acute symptoms of intoxication were only one-tenth of those following intramuscular injection, they consider that the spinal route is unsuitable for general use. They next gave serum intravenously; for children two to five cubic centimetres were used according to the severity of the infection and three to five cubic centimetres for adults. The rash disappeared within six hours as compared with twenty-four to forty-eight when the intramuscular route was used, and the temperature became normal within six to seven hours. Later development of complications and serum sickness were also greatly reduced. The intramuscular route was used in 26 cases, and complications were noted with four. The main cause of the difference in action lies in the locking up of antitoxin in the tissues for an appreciable time when the intramuscular route is chosen. On an average the antitoxin remains for five days around the site of injection. When used intravenously the serum should contain no preservative because of the risk of poisoning in patients with an idiosyncrasy to trikresol or carbolic. It is contraindicated for any patient to whom horse serum has previously been given. Before administration a test intracutaneous injection of serum should be given and any urticarial reaction noted.

Intestinal Obstruction.

A. GOSSET, L. BINET, A. CODOUNIS AND D. PETIT-DUTAILLIS (*La Presse Médicale*, June 13, 1931) have described some investigations into the state of the blood in intestinal obstruction. Intravenous injections of saline solution have been usefully employed in intestinal obstruction. Several authors have shown that a condition of hypochloræmia exists in that disorder. Five dogs in which intestinal obstruction occurred, were examined. The serum chloride fell from approximately 4·0 grammes to 2·84 grammes *per centum* or less; serum sodium showed a less marked fall. Non-protein nitrogen rose from 0·30 to 0·90, 1·26, 1·40 and 2·48 grammes just before death. Total protein increased from 66 to 84 grammes *per centum*. Total fats showed an increase, and there was slight hyperglycæmia. Similar results were obtained in the five dogs which were given only water to drink during the investigations.

Treatment of Pulmonary Tuberculosis.

W. HEBENSTREIT (*Deutsche Medizinische Wochenschrift*, August 28, 1931) gives his results in the treatment of pulmonary tuberculosis with a combination of pneumothorax and avulsion of the phrenic nerve. In forty-three cases avulsion of the phrenic nerve was performed with the following complications in four instances: thrombosis of the external jugular vein in the region of the incision; severe hæmoptosis on the third and sixth days in a patient who had not previously coughed any blood; rise in temperature and general malaise; fistula formation. When phrenic avulsion was combined with production of a pneumothorax the incidence of complications was increased. The author noted in particular severe respiratory changes with alteration in the position of the heart, also the formation of serous exudates. On the whole, he prefers to perform pneumothorax at first and only when this is unsuccessful or produces poor results does he advocate resection of the phrenic nerve. Despite the higher incidence of complications, he considers that this combination of treatments offers a reasonable measure of success in many cases.

Diagnosis of Latent Jaundice.

O. KLEIN (*Klinische Wochenschrift*, October 31, 1931) discusses the early diagnosis of latent jaundice by intradermal injections of 0·1 to 0·2 cubic centimetre of histamine. Following the injection of histamine a hyperæmic area surrounds the actual site of injection. In icteric patients a yellow stain appears almost immediately in the hyperæmic zone, followed later by coloration of the inner portion, due to the passage of bile pigments from the capillaries into the surrounding connective tissue. The reaction occurs in latent jaundice when the bilirubin content of the blood is but slightly raised. It is positive in hæmolytic jaundice, in cases with a negative direct Van den Bergh reaction as well as in those with the positive indirect reaction. In hepatogenous jaundice the reaction is less intensive and occurs only when the bilirubin content of the blood is increased. In hæmolytic jaundice the result of the test is positive when the bilirubin is over one milligramme *per centum*; below this figure and in the presence of an indirect Van den Bergh reaction the test gives no reaction. Therefore the test gives results at a stage when clinical symptoms are latent.

Special Articles on Aids to Diagnosis.

(Contributed by Request.)

XI.

THE CLINICAL SIGNIFICANCE OF PLASMA PHOSPHORUS, CHOLESTEROL, CHLORIDE AND SERUM CALCIUM ESTIMATIONS.

DURING the last few years the development of blood chemistry has progressed in a marked fashion, and in some pathological states the chemical constituents of the blood are known to show such definite and consistent changes that their estimation is of paramount importance from the standpoint of diagnosis and treatment. Thus in diabetes the alterations in the blood glucose are so clearly defined that its estimation affords us the greatest possible assistance when formulating an opinion as to diagnosis.

In contrast to this particular investigation there is a large and scattered body of evidence concerning the significance of changes in other constituents of the blood, such as inorganic plasma phosphate, cholesterol, serum calcium *et cetera*. Unfortunately the members of this group are not definitely and exclusively associated with particular diseases, as is the case with blood glucose and diabetes, so that at present one is unable to speak of changes in the concentration of such constituents with anything like the certainty that is possible with blood sugar. A considerably greater amount of investigation will be necessary before this stage is reached, and the reader will therefore appreciate the difficulties of assessing the value of changes in the concentration of the chemical substances at present under discussion.

The Inorganic Phosphate Content of the Blood Plasma.

Clinical investigations on blood phosphorus have been confined chiefly to the inorganic variety present in the plasma, and it must be clearly understood that this form does not comprise the important hexose-phosphates. Practically all of the ester phosphorus is present in the red blood corpuscles, and unless precautions are taken to prevent laking of the blood or keeping it too long before precipitation of proteins, hydrolysis of the phosphoric esters by enzymes liberated from laked red blood corpuscles occurs and destroys the quantitative significance of figures for inorganic plasma phosphate.

Method of Estimation.

The method usually adopted is de Wesselow's modification of Bell and Doisy's method. Full details of the exact procedure may be found in "Recent Advances in Medicine," by Beaumont and Dodds, or in "Clinical Biochemistry," by Maxwell. The method of Briggs, as modified by Martland and Robison (*Biochemical Journal*, Volume XX, 1926, page 847) is very convenient and is as follows:

Solutions Required.—The following solutions are required:

A.	Concentrated sulphuric acid ..	30 cubic centimetres.
	Water to	100 cubic centimetres.
B.	Ammonium molybdate	10 grammes.
	Water to	100 cubic centimetres.
C.	Sodium sulphite	20 grammes.
	Quinol	0·5 gramme.
	Water to	100 cubic centimetres.
D.	Trichloracetic acid	3·5 grammes.
	Water to	100 cubic centimetres.
E.	Standard mono-potassium phosphate	

Pure acid potassium phosphate (KH_2PO_4) crystals are powdered and desiccated for several days, and then 4·394 grammes are dissolved and made up to 1,000 cubic centimetres with phosphate-free water. This solution contains one milligramme of phosphorus in one cubic centimetre, and for the actual estimation requires to be diluted, usually so that one cubic centimetre contains 0·05 of a milligramme. The one disadvantage of this method is that the molybdate solution, if kept for any length of time, precipitates, but the ease with which this solution can be made up discounts this defect.

Blood is collected by vein puncture into a tube containing potassium oxalate (not more than two milligrammes per cubic centimetre of blood) and plasma obtained by centrifuging. The plasma is deproteinized by diluting one in five with solution *D*, and after standing for fifteen minutes, filtration is carried out through a phosphorus-free paper (number 30 Whatman).

Five cubic centimetres of filtrate (equivalent to one cubic centimetre of plasma) are pipetted into a fifteen cubic centimetre graduated flask and a suitable volume of the standard KH_2PO_4 is measured into a similar flask. Both solutions are made up to approximately ten cubic centimetres with distilled water and then one cubic centimetre each of the solutions *A*, *B* and *C* is added. After dilution to the 15 cubic centimetre mark the contents are thoroughly mixed and colorimetric readings taken after half an hour. It is usually convenient to prepare the standard so that one cubic centimetre equals 0·05 milligramme of phosphorus, but with a high plasma phosphate content it may be necessary to use a stronger standard or less filtrate.

The Interpretation of Results.

The normal value for the inorganic phosphorus of the blood plasma averages 3·5 milligrammes *per centum*. It is somewhat higher in infants, being about five milligrammes per 100 cubic centimetres. De Wesselow has laid great stress on the phosphate "retention" that occurs in azotæmic nephritis, and reports values of twenty to thirty milligrammes *per centum*. It does not appear that phosphate determinations are at all necessary from the standpoint of diagnosis, but according to de Wesselow their estimation affords a valuable aid to prognosis, and this author considers that a figure over ten milligrammes *per centum* denotes a hopeless outlook. Apparently the concentrating power of the kidney for phosphate and creatinine is approximately the same, so that from the standpoint of prognosis phosphate accumulation can be regarded as equivalent to creatinine retention.

The following table, taken from de Wesselow ("Chemistry of Blood in Clinical Medicine") illustrates the prognostic values of plasma phosphate and blood urea determinations.

Blood Urea in milligrammes per 100 cubic centimetres.	Cases.	Deaths.	Plasma Phosphates in milligrammes *per centum*.	Cases.	Deaths.
400 to 600	9	9	10 to 25	15	15
300 to 400	5	3	8 to 9	6	2
200 to 300	6	3	7 to 8	2	—
100 to 200	8	2	6 to 7	4	—
50 to 100	10	—	5 to 6	9	—
Below 50	32	—	Below 5	34	—

Dodds has also emphasized the importance of phosphate estimations as an aid to prognosis, and has pointed out that mere estimation of the blood urea may sometimes prove fallacious, since dehydration alone might account for a blood urea of over 100 milligrammes *per centum*.

Considerable controversy has existed concerning the exact rôle played by phosphates in the causation of uræmia. The retention of phosphates is held by some authorities to assist in the production of acidosis. The actual toxicity of the phosphate ion is still rather doubtful, and Binger is of the opinion that the symptoms produced in dogs by the injection of di-sodium phosphate are not due to any toxic action of the phosphate ion, but are caused by a disturbance of the sodium-calcium balance of the blood. De Wesselow, after carefully analysing all the available experimental data, concludes that, apart from the symptoms of acidosis, it is doubtful whether the uræmic intoxication can in any way be attributed to phosphate accumulation in the blood. Whilst not denying the prognostic significance of high plasma phosphate values, it is by no means certain that such figures justify the universally accepted idea of phosphate "retention" in nephritis with a low urinary excretion.

Boyd, Courtney and McLachlan, in 1926, were the first to throw some doubt on the occurrence of phosphorus retention, since they found that evidence of retention as given by blood and balance studies did not always agree. Byrom and Kay, in 1927, found that the total blood phosphorus showed no increase in nephritic subjects. Their results indicated merely a redistribution of the acid-soluble phosphorus, whereby the inorganic variety increased at the expense of the non-hydrolysable ester phosphorus of the red blood corpuscles. Recently Ford[1] has conducted a series of phosphorus and calcium balance studies in nephritic children. His results are most interesting and informative, since he fails to find evidence of abnormal phosphorus or calcium retention, but merely a deviation of excretion from the urine to the fæces. The process of restoration to the normal urinary route of excretion was found to be extremely slow and to occur some considerable time after convalescence.

Before leaving the question of blood phosphorus it might be worth while to mention a simple test of renal function described by H. D. Kay and known as the glycerophosphate test. In principle it is as follows:

At 8 a.m. the bladder is emptied and 400 cubic centimetres of water or weak tea taken. At 9.30 a.m. ten cubic centimetres of a sterile 8% aqueous solution of sodium β glycerophosphate are injected intravenously. This drug is cheap and capable of easy sterilization. The urine is collected after one hour and its phosphate content estimated after precipitating any protein present. The phosphate may vary from nil (in chronic nephritis) to 250 milligrammes or more.

From observations on seventy cases Kay concludes that: (i) A normal subject excretes at least 150 milligrammes. (ii) If less is excreted, there is definite renal involvement which varies inversely as the amount excreted.

Blood Cholesterol.

Most methods of estimating blood cholesterol represent some modification of that originally developed by Bloor and depend on the Liebermann-Burchard colour reaction, namely, that acetic-anhydride and sulphuric acid produce a blue colour when added to cholesterol solutions.

Myers and Wardell's method is as follows:

The requirements are acetic-anhydride, plaster of Paris, pure sulphuric acid, Soxhlet extraction apparatus, standard cholesterol solution (0·8 milligramme in ten cubic centimetres of chloroform).

One cubic centimetre of plasma is placed in a porcelain dish containing about five grammes of plaster of Paris and the mixture stirred well with a glass rod until a uniform paste is obtained. The dish and contents are then placed in a drying oven at 100° C. for from one to two hours, after which the dish is removed and the contents finely powdered and transferred to a Soxhlet extraction apparatus in which the cholesterol is extracted by means of chloroform. After thirty to sixty minutes' extraction the chloroform solution is removed and concentrated down by evaporation and made up to twenty cubic centimetres. Five cubic centimetres of this solution are pipetted into a test tube and five cubic centimetres of the standard cholesterol solution placed in a similar test tube. Two cubic centimetres of acetic anhydride and 0·1 cubic centimetre of the pure concentrated sulphuric acid are added to both tubes, and after being thoroughly mixed the solutions are placed in the dark for ten minutes and, finally, colorimetric readings taken. If the standard is set at twenty millimetres, then the cholesterol percentage equals

$$\frac{20}{\text{Reading of unknown}} \times 0{\cdot}08 \times 4 \times 100$$

The normal values given for the blood cholesterol differ according to various authorities. Beaumont and Dodds accept figures of from 100 to 150 milligrammes per 100 cubic centimetres of blood, whilst Bloor has established a figure of 230 milligrammes *per centum* as the maximal normal range. In certain cases of *diabetes mellitus* the blood cholesterol may be as high as 600 to 800 milligrammes *per centum*.

It cannot be argued that the estimation of blood cholesterol is essential for the diagnosis of any particular disease, but, on the other hand, its determination occasionally affords useful confirmatory evidence. Thus, in chronic parenchymatous nephritis (nephrosis), extraordinarily high values may be found (up to 1,000 milligrammes *per centum*), but here again the diagnosis is perfectly obvious on clinical grounds, and the estimation of cholesterol gives no essential help either in diagnosis or treatment. Rabinowitch, from observations on a large series of diabetic patients, concludes that routine cholesterol estimations afford a better index of the course of the disease than blood sugar determinations. A high plasma cholesterol may be associated with a normal blood sugar and, according to Rabinowitch's observations, the subsequent progress of such a patient is not as satisfactory as one in whom both these constituents are normal. It is also considered that a striking relationship exists between hypercholesterolæmia and diabetic gangrene. In view of the conflicting opinions that have been expressed concerning the association of increased cholesterol in the blood of diabetic patients and the production of arteriosclerosis, it is refreshing to note the sane opinions recently expressed by Joslin.[2] This author concludes that all attempts to demonstrate the harmful effects of hypercholesterolæmia have failed and also that efforts to prevent the development of this condition by prescribing low fat and high carbohydrate diets are both unnecessary and ineffectual.

Extraordinarily interesting data are given by Shaw and Sharpe,[3] a summary of whose work appeared recently in *The British Medical Journal*. These workers have investigated the cholesterol and lecithin metabolism in various mental disorders. A low cholesterol content has been found in brains of general paralytics, and it is suggested that this deficiency may have some influence on the initiation of central nervous system infection. In addition, low plasma cholesterol values were found in *dementia præcox*, and in such patients attempts are being made to increase the blood cholesterol by parenteral injections and feeding with cholesterol emulsions. The results of such experiments will be awaited with interest.

Blood Calcium.

Calcium is usually estimated in the blood serum, and the method adopted is chiefly that of Kramer and Tisdall. In principle this method consists of precipitating the calcium as ammonium oxalate, which is then titrated against a standard potassium permanganate solution.

Method of Estimation.

The following reagents are required: (i) Saturated ammonium oxalate solution. (ii) Approximate N/1 H_2SO_4. (iii) N/100 potassium permanganate solution. (This must be carefully standardized against an accurate N/100 sodium oxalate solution.)

Two cubic centimetres of serum are pipetted into a graduated centrifuge tube containing two cubic centimetres of water. One cubic centimetre of saturated ammonium oxalate solution is then added and the contents of the tube thoroughly mixed. After standing for one hour the contents are again mixed and centrifuged at 1,500 revolutions per minute for five minutes. A capillary pipette is used to remove the greater portion of the supernatant fluid and 2% ammonia is run in up to the four cubic centimetre mark, care being taken to wash down any deposit from the sides of the tube. The fluid is again mixed and centrifuged and the above process is repeated twice, thus making three washings in all. The precipitate of calcium oxalate is now dissolved in two cubic centimetres of approximately normal sulphuric acid and the tube with its contents placed in a boiling water bath until solution of the calcium oxalate is complete.

Titration is carried out whilst still hot with N/100 potassium permanganate. The number of cubic centimetres of permanganate used multiplied by ten equals the number of milligrammes of calcium per hundred cubic centimetres of serum.

Interpretation and Significance of Results.

The normal value for serum calcium is usually accepted as nine to eleven milligrammes per hundred cubic centi-

metres. In considering the question of calcium metabolism, one is forced to admit that it is one of the most perplexing of all biochemical problems and that at present it is quite impossible to dogmatize concerning the behaviour of serum calcium in relation to disease. The actual formation of calcium in the body is at present imperfectly understood, although there is some evidence to indicate that it exists partly as chloride, phosphate and bicarbonate and partly as colloidal phosphate stabilized by the body proteins. About 60% of the total amount is present in a diffusible form, while the remainder is bound to protein and non-diffusible. In addition, some of the diffusible fraction exists in the ionized state.

The experiments of Percival and Stewart clearly indicate the existence of a diffusible fraction. Thus, following the injection of fluid with and without calcium into the peritoneal cavity of a cat, the fluid recovered always contained about six milligrammes of calcium *per centum*. In azotæmic nephritis with a definite increase of the inorganic plasma phosphate, there also appears to be a marked decrease of the calcium content of the serum. Figures as low as five to six milligrammes *per centum* have been reported by de Wesselow. Although it is possible to produce in animals experimental rickets associated with a low serum calcium, the relationship of this substance to rickets in children is not so clear. Severe rickets may be present with a normal or low calcium, and to some extent the same findings may occur in tetany. Certain suggestive evidence is being accumulated to show that a close relationship exists between vitamin *D*, parathyreoid secretion and calcium metabolism. The theory has been advanced that parathyreoid secretion and vitamin *D* are vital factors concerned in making calcium available for the body's metabolism, so that if these substances were not functioning in their normal manner, deficiency symptoms might occur, even in the presence of a normal serum calcium. Hansman has recently described an interesting symptom complex following thyreoidectomy and suggestive of parathyreoid deficiency. He has reported extremely beneficial results following the administration of "Radiostol" (vitamin *D*). The metabolic condition underlying tetany is still an obscure problem, and although there is a body of evidence to suggest the implication of calcium metabolism, it seems that we will have to make a diagnosis chiefly on clinical grounds, recognizing certain symptoms and signs as associated with a defective calcium metabolism. In any case the problem is far from being solved.

Blood Chlorides.

Method of Estimation.

The method of estimation of blood chlorides is as follows:

The reagents required are:

(1) Standard silver nitrate solution (2·905 grammes of silver nitrate dissolved in water and made up to 1,000 cubic centimetres). One cubic centimetre equals one milligramme of sodium chloride.

(2) Standard potassium thiocyanate solution. Dissolve 1·7 grammes of potassium thiocyanate in a litre of water and adjust the strength of this solution by titration and dilution so that five cubic centimetres are equivalent to five cubic centimetres of the standard silver nitrate solution.

(3) Powdered ferric ammonium sulphate (alum).

(4) Pure nitric acid.

Ten cubic centimetres of protein-free blood filtrate (prepared according to Folin and Wu's method) are pipetted into a white porcelain dish. Five cubic centimetres of the silver nitrate solution and five cubic centimetres of nitric acid are added together with a small quantity of the powdered alum. After standing for a few minutes titration is carried out by means of the thiocyanate solution until a definite salmon red end point is reached. This colour should persist for at least fifteen seconds.

Calculation.

Five *minus* the titration figure by 100 equals milligrammes of sodium chloride per 100 cubic centimetres of blood.

At present there is no clinical condition in which the chloride estimation can be advised as a routine method for diagnosis or treatment. The chloride content of whole blood expressed as NaCl varies from 0·45 to 0·50 *per centum*, and of plasma from 0·56 to 0·62 *per centum*. No useful purpose can be served by detailing the few scattered conditions in which variations in the blood chloride occur. Although chloride retention undoubtedly occurs in various forms of nephritis, the diagnosis is perfectly clear on other grounds.

Conclusions.

It must be fully realized that our knowledge of the true significance of changes in the foregoing chemical constituents of the blood is far from complete, and therefore extreme caution is necessary before we can accept the various assertions that are made from time to time concerning the value of such investigations in clinical medicine. There is always the risk that therapeutic measures may be based on insufficient data and therefore advance ahead of the known experimental facts. Nevertheless, for the careful observer the above discussed aspects of biochemistry offer a very fruitful field for research.

References.

(1) F. J. Ford: "Calcium and Phosphorus Metabolism in Nephritis," *Archives of Diseases in Childhood*, Volume VI, August, 1931, page 209.
(2) E. P. Joslin: "An Appraisal of the Present Treatment of Diabetes," *The Journal of the American Medical Association*, Volume XCVII, August 29, 1931, page 595.
(3) B. H. Shaw and J. S. Sharpe: "Cholesterol in Mental Disorders," reviewed in *The British Medical Journal*, August 8, 1931, page 252.

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British Medical Association News.

SCIENTIFIC.

A MEETING OF THE SECTIONS OF NEUROLOGY AND PSYCHIATRY, HYGIENE AND PREVENTIVE MEDICINE, AND OTO-RHINO-LARYNGOLOGY OF THE NEW SOUTH WALES BRANCH OF THE BRITISH MEDICAL ASSOCIATION was held at the Robert H. Todd Assembly Hall, British Medical Association House, 135, Macquarie Street, on August 14, 1931, DR. J. S. PURDY in the chair.

Noise.

DR. J. S. PURDY read a paper entitled: "Noise, A Nuisance Dangerous or Injurious to Health" (see page 46).

DR. CHARLES WARREN read a paper entitled: "Effects of Noise on the Nervous System" (see page 49).

DR. DONALD FRASER read a paper entitled: "The Psychological Effects of Noise" (see page 50).

PROFESSOR HARVEY SUTTON drew attention to the efforts made by the British Medical Association in England in July, 1928, to obtain more adequate legal control of noise by legislation, especially urging that any noise between 11 p.m. and 6 a.m., capable of being prevented or mitigated, and which was dangerous or injurious to health, should be considered a nuisance under the *Public Health Act*. So far, little had resulted, though the Ministry of Road and Transport had tightened up the regulations under the motor car acts, and physicists had undertaken investigation into the character of noises.

In considering the effect of noise, it might be said that rhythmic, uniform, predictable noises of lower pitch, whether musical or otherwise, were largely free from objection. The noise that one made oneself, as many men did in the bathroom, might be thoroughly enjoyed.

In his study of conditioned reflexes Pavlov had shown the effect on dogs of the repetition of an indifferent auditory stimulus in producing drowsiness and sleep, an effect long ago discovered by mothers in putting children to sleep with a lullaby. The discordant, discontinuous, unexpected, high-pitched noise readily produced profound

physiological responses, for example, a loud whistle blown suddenly behind and close to a person's ear caused marked exaggeration of the knee jerk even before the emotional response of anger and the desire to kick the person downstairs. The constant necessity for inhibition of such impulses placed an undue strain on the sympathetic and glandular systems of the body—the mechanisms which controlled instinctive reactions of self-preservation in fight or flight. Allowance had to be made for the power of adaptation. It was stated that the city dweller, more or less accustomed to the varied, frequent and objectionable noises of industrial conditions, reacted less unfavourably to the tremendous and terrifying experience of noise in warfare than the rural recruit whose previous environment had been quieter and more peaceful. People living near a large battery of stampers might complain of lack of sleep on the one quiet night, Sunday, of the week, while country visitors to the seaside occasionally complained of the constant roaring of the waves, to which the seaside dweller paid no notice.

Unfortunately, the striking increase of machinery and worship of speed, the development of concrete buildings, which acted as good conductors of sound, the overcrowding of workrooms and offices, and, strange to say, the more hygienic methods of the open window and abolition of carpets, curtains and hangings, all contributed to the welter of noise to which this generation was being subjected. As Dr. Spooner expressed it: "It is a revolution, not a change of fashion, that we are passing through."

A previous speaker had already referred to the marked changes on the cochlea of the internal ear produced by the frequent recurrence of irregular and unpleasant noises. Apparently a chronic degenerative neuritis was set up. In the industrial world such happenings were not infrequent, and deafness, for example, was frequently noted amongst boiler-makers, amongst whom figures of 30% up to 90% were recorded. One curious point noted in Sydney amongst a certain group of riveters was that most of those found deaf suffered from middle ear deafness which had occurred previous to their taking up riveting. This finding suggested that to some extent middle ear deafness might act in a selective fashion, such types preferring riveting and sticking to their job, where more sensitive workmen might give it up. The middle ear trouble acted in the same way as the ear tampon of cotton wool recommended by aurists, and cut off excessive sound vibration from reaching the internal ear.

It had been stated that neurasthenia was never caused by noise alone. In connexion with one of the dental clinics of the Education Department, the following interesting occurrence took place. A clinic consisting of several visiting dentists and three full-time women dental assistants had been working in a city building under quiet conditions, when a factory which included in its equipment sewing machines driven by power, established itself in the floor above. The building was of concrete with wooden floors. The result was a tremendous amount of noise, so loud as to make it difficult to hear oneself speak, together with some vibration. Even the visiting dentists, who spent there only three hours a week, complained, and after a few months first one and then another of the dental assistants definitely broke down with undoubted neurasthenia. No doubt the combination with busy and exacting work counted, but the exciting cause was undoubtedly the noisy conditions, and these were responsible for a long period of sick leave and very definite chronic fatigue of the central nervous system.

The control of noise was a difficult but not insoluble problem. Individual examples might be given of success in reducing noise in connexion with machinery. The old type centrifuge in laboratories was bolted to a slab of masonry, producing a noisy racket and even exploding with dangerous results. The modern centrifuge sitting on rubber wheels fitting in rubber castors produced a pleasant hum like a singing top with almost complete absence of vibration and noise. The abominable noise of riveting could be completely eliminated by modern hydraulic methods. The difficulties occurring with concrete and modern hygienic rooms *et cetera* awaited the attention of the engineer and architect, but they should be readily brought under control.

Above all, the hours of sleep should be kept free from irritating noises. Much of the wear and tear shown by nurses on night duty was due to the difficulty of sleeping in the day time, with its frequent disturbances and noise conditions. Especially was this important in hospitals where convalescent or nervous patients might be unfortunately influenced. They might have to sacrifice something in their present race for efficiency; anything for a quiet life.

ASSISTANT PROFESSOR EDGAR BOOTH said that noise was a disturbance made by other people and transmitted, generally by the air, as sound waves. By noise speakers usually meant any sounds that were disturbing or irritating; so that they might even include pure musical tones in this category, though these would not be accepted by the physicist or musician as being "noises" in the strict sense. For instance, a high pitched, loud, long maintained note might be very annoying to anyone in its vicinity.

The human auditory system was sensitive to air oscillation over a wide range; oscillations of from 30 per second to 30,000 per second were detected as sound. The pitch of a note depended on this frequency of air vibration—middle C, for instance, was an oscillation occurring 256 times per second, whilst the octave above was an oscillation occurring 512 times per second; these frequencies varied slightly with the "tuning" of the instrument. The ear could not detect any increase in pitch after the note went above 10,000 per second. The maximum displacement of the air at the ear (the amplitude of the disturbance) need not be great to enable it to be heard; amplitudes as small as one one-hundred-millionth of a centimetre (10^{-8} centimetres) were audible under suitable conditions.

A noise, in the meaning of an anti-noise campaign, was anything to which they did not wish to listen; so that if they were endeavouring to listen to small amplitude disturbances (for instance, people talking in a room) any extraneous disturbances of equal or greater amplitude were annoying and thus constituted noises. They had devices which would detect noises of different frequencies and measure their relative amplitudes. As a result of a large number of experiments conducted both for pure research purposes and to assist the Railway Commissioners, Professor Booth had found that people were not in general disturbed by low frequency sounds (probably because the sounds did not interfere with their listening to themselves and to other people) even though the noises might represent a big amplitude air wave; but they were disturbed by frequencies over 300 per second, even with a relatively very small amplitude. So that with any noise-detecting and noise-measuring device, it was essential that they should be able to work in suitable ranges of frequencies and be able to vary these ranges. Most energy in general row was associated usually with low frequency disturbances—much of it of subauditory frequency. They were not interested in that, and their detectors had to be so tuned that it was not included.

A suitable detecting and measuring device consisted of broadly tuned resonators, with very fine platinum wires across their orifices; these fine wires formed an arm of a balanced wheatstone network, the current through them heating them to a dull red. Fluctuations of air in the resonator (caused by sounds of the same broad frequency band) washed the fine wire, cooling it and so decreasing its resistance and upsetting the bridge balance. The deflections of the bridge galvanometer enabled the amplitudes of the sounds to be compared. The system was due to Major Tucker and was employed in "sound ranging" in the war. The noisiest things in Sydney (sending out most energy per second on disturbing frequencies) were the trams; but to anyone trying to get to sleep, the neighbour's cat on the front lawn or the woman singing next door might be more upsetting.

Professor Booth concluded by saying that it was obvious that they must endeavour to reduce to a minimum all unwanted sound and to eliminate all disturbers and disturbances with which they could dispense; the problem was not one merely of the intensity of the disturbance.

MR. E. T. FISK, Managing Director, Amalgamated Wireless, said that Sydney was undoubtedly a noisy city, less

noisy than New York, but equally as noisy as, if not more noisy than, London. In his opinion a great amount of the harmful effect of city noise might be traced to the distinction between mere noise and musical sounds. Although city noises were periodic, they were relatively highly damped and they contained irregular overtones. Musical sounds were, of course, periodic—their impulses occurred at regularly repeated intervals in time, they were not highly damped, and they contained regular and harmonious overtones. To the lay observer it was the difference between discord and harmony.

Mr. Fisk had studied the subject of city noise for a number of years and particularly the problem of excluding noise from open windows and other ventilating apertures. He had devised and patented a number of novel methods for reducing the transmission of street noises through open windows and ventilators. Most of the trouble caused in city apartments was from upward moving sound waves, which originated on a road and were transmitted in all upward directions in straight lines from the point of origin. By various applications of reflection and absorption to practical window and ventilator construction he had installed in the city sound-proof windows which, although wide open for ventilation, kept out street noises as effectively as, and in some cases more effectively than, an ordinary closed window.

The serious effects upon human beings of city noises had been stressed by all speakers, and one gentleman had gone so far as to suggest that if this trouble was not eliminated, it would contribute one important step toward the breakdown of modern civilization. He was not one of those who entertained the belief that modern civilization was about to crash. City noises were the indirect results of modern methods of transport and construction introduced by the engineer, the scientist and the architect. The solution of the problem, in his opinion, lay not so much in the direction of legislation, but mainly in the direction of a cure. The physics of sound had been thoroughly understood for many years, and they must look to the physicist, the engineer and the architect to apply known principles in new directions, and by that means first to reduce the nuisance and harmful effects of city noise, and ultimately, although the latter was a long way ahead, to eliminate such noise altogether.

The following resolutions were adopted by the meeting:

> That the British Medical Association Council ask the Honourable the Ministers for Health and Local Government to introduce legislation to control noise, on similar lines to that *re* smoke abatement.
>
> That Dr. Shirley W. Wynne, Commissioner of Health, New York, be congratulated on the excellent work and report of the New York Noise Abatement Commission.

Dr. Purdy said he would convey the resolution to Dr. Wynne and invite him to visit Australia, and particularly Sydney, at his (Dr. Wynne's) own cost.

NOMINATIONS AND ELECTIONS.

THE undermentioned has been nominated for election as a member of the New South Wales Branch of the British Medical Association:

Sampson, Bernard Moore, L.R.C.P. (London), M.R.C.S. (England), 1903, Rydalmere Mental Hospital, Rydalmere.

University Intelligence.

THE UNIVERSITY OF SYDNEY.

A MEETING of the Senate of the University of Sydney was held on December 7, 1931.

The degree of Bachelor of Surgery was conferred upon Donald Alastair Cameron.

The use of the University buildings was granted to the Australian and New Zealand Association for the Advancement of Science for the meetings to be held during the month of August, 1932.

The following appointments were made:

Dr. N. E. Goldsworthy as Lecturer in Bacteriology.

Dr. A. E. Mills as Examiner in Neurology for the Diploma in Psychiatry.

Mr. A. N. Colefax as Lecturer and Demonstrator in Zoology.

On the recommendation of the University Extension Board, it was decided that in 1932 a matriculation class in Italian be held twice a week during the academic year and a beginners' class once or, if necessary, twice during the same period.

Dr. A. Baccarini has been appointed to conduct these classes.

The following were elected Fellows of the Senate for a period of two years from January 1, 1932: Professor F. A. Todd, Dean of the Faculty of Arts; Dr. C. B. Blackburn, Dean of the Faculty of Medicine; Professor T. G. B. Osborn, Dean of the Faculty of Science; Professor Sir Henry Barraclough, Dean of the Faculty of Engineering.

The Anderson Stuart Memorial Research Fellowship was, on the recommendation of the Faculty of Medicine, awarded to Mr. C. H. Horsley, M.B., B.Sc. Mr. Horsley graduated Bachelor of Science in 1927, with first class honours and the University Medal in Physiology. In 1930 he took the degree of Bachelor of Medicine with second class honours.

Admission of Graduates of the University as Undergraduates in Other Faculties.

The Senate has decided on the recommendation of the Professorial Board, supported by the whole of the ten faculties of the University, to admit graduates of any faculty of the University of Sydney to any other faculty without calling upon them to pass in the additional matriculation subjects prescribed, provided they have passed the general matriculation examination. Hitherto entrance to each faculty was determined by candidates passing the matriculation examination in certain prescribed subjects or by them holding a definite degree. For example, candidates might enter the Law School after having graduated in Arts or having completed seven courses in the Faculty of Arts. The holders of a degree in Arts or in Science could enter the Faculty of Engineering, likewise the Faculty of Medicine. Under the new system it will now be possible for any graduate, so long as he has passed the general matriculation examination, to enter the faculty of his choice.

The By-Laws Committee of the Senate will be asked to make the necessary amendments to the several by-laws affected and it is hoped that the new scheme will come into operation at the beginning of the next academic year.

Obituary.

MALCOLM LESLIE SCOTT.

DR. MALCOLM LESLIE SCOTT, whose death occurred on November 3, 1931, was born on June 25, 1882, in College Park, a suburb of Adelaide, where his father was well known and esteemed in business circles for many years. He received his early education at Prince Alfred College, where he held a good record in his classes, and for two years in succession won the intercollegiate championship in club swinging. He entered the medical course at the Adelaide University in 1899, graduating Bachelor of Medicine and Bachelor of Surgery in 1904. He was placed top of his year in his first and fourth year examinations and second in his final. He was a resident medical officer at the Adelaide Hospital in 1905, and for the next two years was assistant to Dr. H. A. Powell at Kadina. He spent 1908 and 1909 in England doing a post-graduate course

in surgery, and in 1909 passed the examination for the Fellowship of the Royal College of Surgeons in England. He then returned to South Australia, where he was in general practice at Mount Barker from 1910 to 1916. During these years he conducted an extensive country practice and was trusted and admired by the residents of the district until his death.

In 1916 he volunteered for active service overseas at considerable personal sacrifice. His war service was as meritorious as his work at home. Early in 1917 he was appointed to the permanent surgical staff at Number 1 Australian General Hospital at Rouen, being temporarily detached as operating surgeon in a surgical team which was sent to a British casualty clearing station in the Passchendaele section during the summer. Later in the same year he was for a short period again detached to act as first operating surgeon of the Number 6 (British) General Hospital of 2,000 beds. In 1918 he was appointed first operating surgeon and surgical specialist to Number 1 Australian General Hospital in Rouen, with command of the surgical division in that hospital. In this position his work made definite advances in knowledge regarding the drainage and treatment of infected joints, especially the knee joint.

On returning to South Australia in 1919 he began practice as a general surgeon in Adelaide. He gained his Master of Surgery degree by thesis in that year and was appointed Honorary Surgeon to the Out-Patients' Department at the Adelaide Children's Hospital. Later he was appointed to the senior staff at the Children's Hospital and was made Honorary Consulting Surgeon to that institution in 1927, when he resigned from his senior position on being appointed honorary surgeon at the Adelaide Hospital. He was a foundation member of the Royal Australasian College of Surgeons.

At the University of Adelaide he was appointed Demonstrator in Anatomy in 1919, Lecturer in Regional and Surgical Anatomy in 1920, and Lecturer and Examiner in Clinical Surgery in 1927. From 1920 until his death he was a co-examiner in anatomy and in operative surgery. For many years also he lectured in surgery in the nursing courses.

His interest in education was displayed by his position as a member of the Council of Governors and of the Education Committee at Scotch College for the last ten years of his life, and by his membership of the Council of the Presbyterian Girls' College from its foundation. He was also Chairman of the Education Committee of this institution.

These activities, combined with an increasing surgical practice, kept him fully employed, but he found time to serve on the Council of the South Australian Branch of the British Medical Association for two years, was a regular attendant at the Branch meetings, and was always ready to assist any movement in the interests of the medical profession. For the past year he had looked like an overburdened and sick man. Although for some months he must have known the seriousness of his condition, yet with his usual reticence, he put on one side any inquiries by his friends and continued in full work till a few weeks before his death. He leaves a widow and six young children.

His death is a serious loss to the medical profession in South Australia and also to the cause of education and to the community generally. The standards he set himself in his professional work and in his personal life were high, and his reputation in both fields was equal to his standards. His surgical work was characterized by thoughtfulness and thoroughness. In his personal relationships he was trusted and esteemed by colleagues and patients and by all with whom he came in contact. An unusual number of students and nurses used to appeal to him when in need of surgical help, not because of his showiness or brilliance, but because they trusted him. The dominant features in his personal character were his honesty and restraint. In his speech the latter quality approached reticence that at times was almost painful. Yet with it he had a quiet wit and sense of humour which made him a delightful companion.

MERVYN ATHOL STEWART.

We regret to announce the death of Dr. Mervyn Athol Stewart, which occurred on December 26, 1931, at Melbourne, Victoria.

ANDREW JOHN BRACKEN.

We regret to announce the death of Dr. Andrew John Bracken, which occurred on January 3, 1931, at Waverley, New South Wales.

Correspondence.

DIATHERMY OF TONSILS.

SIR: The letter of Dr. W. Kent Hughes (THE MEDICAL JOURNAL OF AUSTRALIA, November 28, 1931), in which he criticizes Dr. Graham Brown's well reasoned article of October 10, contains many statements which, doubtless, he believes from repetition.

It is interesting to note that thirty-five years of a wide experience gave Dr. Hughes the opinion that it was necessary to remove the whole tonsil. Another five years convince him that there is no disadvantage in leaving remnants. Perhaps the last five years' experience is not so wide as the previous thirty-five.

He admits that two patients have returned with "recurring or fresh sepsis of tonsil remnants". Possibly there are others which have gone elsewhere, or perhaps these are the only two in which he did not completely remove the tonsils. Anyhow, it proves his statement wrong, that it is harmless to leave remnants. He has never given us any standard for measuring how much can be left for no trouble to occur.

He admits that diathermy is tedious, but up to date he has not admitted that Dr. Dan Mackenzie, whom he quotes so often, says it takes two to four months and sometimes six.

He is impatient—one of his few accurate statements—but abandons a "perfectly satisfactory technique" for one that I suppose he calls "more perfect"!

To take his reasons *seriatim*:

1. It is perfectly safe. Many procedures are safe, but frequently inadequate.

2. It is free from hæmorrhage. In his pamphlet Dr. Hughes says hæmorrhage could only arise from too vigorous treatment and that he had never had a case, primary or secondary. He has since reported a case of his own—he must have been more impatient than usual.

3. It is free from pain. I had been blaming my own technique when my patients complained of pain until I heard of one of Dr. Hughes's patients, who said the pain was awful. (This was not quite the phrase he used.)

4. There is no invalidity. Dr. Hughes claims in the pamphlet that there is no loss of time from business or recreation. Most of my patients plan so that they have no evening engagement on the day of treatment. There is sometimes severe pain, though the pillars have not been involved.

5. In his pamphlet Dr. Hughes adds another advantage, namely, absence of hospital and anæsthetic fees. This would carry more weight if Dr. Hughes would add that the surgeon's fee is reduced.

Further, Dr. Hughes says that Dr. Brown's experience with the diathermy knife should teach him that electro-coagulation cannot "bottle up sepsis by scarring over". The diathermy knife and electro-coagulation are totally different things and do not produce the same results.

Dr. Hughes has only met (*sic*) two patients to whom the operation was "nerve racking". Many patients find it "nerve racking" even when they find the procedure is not nearly so bad as they anticipated.

I have read many of Dr. Hughes's articles—I do not pretend to have read them all—but in none of them has he

given any evidence in support of his statement that electrocoagulation of part of the tonsil sterilizes the whole of it.

With Dr. Brown I am quite in accord when he says that "diathermy . . . . has its sphere of usefulness, but that the sphere . . . . is a very limited one indeed".

Yours, etc.,

H. J. GRAY.

195 St. George's Terrace, Perth.
December 6, 1931.

SIR: In a recent work upon the tonsil, reviewed in your journal, reference is made to the difficulties connected with tonsil surgery many hundreds of years ago. Writing from memory, I think the time referred to was at least 1,500 years ago. The main problems were the arrest of hæmorrhage and the question of removal of whole or part of the tonsil. These problems are still with us, although the great majority of medical opinion is in favour of complete removal. Dr. Kent Hughes, however, appears to consider that when surgical diathermy is used, complete removal is not necessary, as the remnants are sterilized. Last week I happened to see a pair of tonsils, or rather remnants, which had just been removed by Dr. R. Graham Brown from a patient who said that the diathermist assured him that he had no tonsil tissue (faucial) remaining. These remnants were immediately handed to Dr. J. V. Duhig, who, after sterilizing the surface with heat, made a culture from deep within the specimen and obtained a free growth of streptococci (not yet typed). So much for the sterilizing effect of diathermy (surgical).

Early in the year I removed large tonsil remnants which where troubling the patient, who had been twice assured by the diathermist that he had no faucial tonsil remaining. These specimens were forwarded to Dr. J. S. Fraser, of Edinburgh, and resulted in correspondence between Dr. Fraser, Dr. Dan Mackenzie and myself. Dr. Fraser is most condemnatory of diathermy removal of tonsils, and it would be difficult to find a more erudite, accomplished and conscientious man than Dr. Fraser, or one whose opinion is more respected.

Dr. Dan Mackenzie we know as an advocate of removal of faucial tonsils by diathermy, but let us compare his attitude with that of Dr. Kent Hughes. Dr. Kent Hughes states as to diathermy (i) it is perfectly safe, (ii) it is free from hæmorrhage, (iii) it is free from pain, (iv) there is no invalidity. Dr. Mackenzie (*Proceedings of the Royal Society of Medicine*, September, 1930) states: "Over-bold diathermizing of this region may lead to hæmorrhage, not at the moment, but days later." (Comment: This is probably one reason for the unsatisfactory results of diathermy, the diathermist consciously or subconsciously being restrained by fear of the accident. A nurse assisting me at a dissection operation upon another throat specialist, invited me to examine her throat, as she had had her tonsils removed in Melbourne by diathermy—Dr. Kent Hughes was not the surgeon; she had as far as I could ascertain a perfect result, but stated that she had twenty-four applications, and that it took her six months to recover from the effects of the hæmorrhage.) Dr. Dan Mackenzie (*idem*): "More or less soreness follows most of even the ordinary séances and it may be quite interfering for a day or two." "Many patients become weary of the long treatment and give up half way. They do not, however, become more weary of it than the surgeon does." "Others are so nervous that it would be cruel to expose them to the treatment." In respect to this contribution (*Proceedings of the Royal Society of Medicine*), Dan Mackenzie himself characterizes it as "a paper full of cautions".

In a letter to Dr. J. S. Fraser, dated March 24, 1931, he states: "The operation [diathermy] is tedious and there is a danger of hæmorrhage. Therefore its use is restricted to a very limited class of patients, namely, to those who cannot stand removal by dissection." "Tonsil diathermy should be performed only by surgeons experienced in tonsil work." "At the same time, I must protest that I cannot be held responsible for the bad work of incompetent men." "Now you doubt again whether a patient unfit for dissection under local could face up to diathermy under local. Your doubts, Fraser, are quite justified in many cases." "You see, we pick our cases for diathermy."

Dr. Kent Hughes states: "We cannot close our eyes to the fact that nearly everyone considers the tonsil fair game. As a universal method diathermy will do less harm than enucleation." I do not think Dr. Hughes considered this statement very carefully. What a reflection upon the ethical and moral attitude of the medical profession! That diathermy "will do less harm than enucleation", in addition to being contrary to fact, is surely very poor and unscientific argument. Again he says: "With a little skill and patience it is quite easy to remove the lot and nothing but the tonsil."

These two statements in particular are much to be deprecated. Personally I have no quarrel with diathermy *per se*, but from results I have seen I feel that statements such as these are dangerous to the general public. They encourage the use of a difficult, tedious and expensive (if completed) method by those who are unqualified to use it, unqualified because they do not realize their own limitations, they do not realize the difficulties of the method and most of all they do not realize the anatomical structure and relationships of the region with which they are dealing.

Dan Mackenzie writes to Dr. Fraser (March 27, 1931): "I am still dissecting out many more than I diathermize. Many, many more. I look on diathermy only as a special method for special cases, but in them it really does well." As an instance of such a special case, in a letter to me date June 15, 1931, he describes a case as follows: "An exophthalmic school teacher . . . . ordinary operation would probably have killed her, even under local anæsthesia. I took a whole year to her and now you could not tell she had exophthalmic goitre at all. . . ." Obviously a very satisfactory result, but still open to the criticism that she may have been able to undergo surgical removal and quite possibly have been restored to health within a few weeks at most, and thus have been saved many months of "invalidity". How many patients are willing to undergo such a prolonged treatment? Even accepting Dr. Kent Hughes's statement as to diathermy entailing "no invalidity" itself, how much time has been occupied by this treatment, and if the surgeon be adequately recompensed, what will the unfortunate patient be required to pay?

Yours, etc.,

ERNEST CULPIN.

Brisbane,
December 8, 1931.

LIPIODOL AND THE LUNGS.

SIR: In reply to Dr. Cotter Harvey's interesting letter on my paper, "Lipiodol and the Lungs", in a recent issue of the journal, I should like to touch briefly on certain points raised therein.

First, it is only to be expected that refinements of method and technique in delivering the lipiodol into the bronchial tree will constantly be coming to light.

My custom has been to do a thorough examination of one lung at a time. In many cases the clinical and X ray findings confine our attention to one lung only, but even in suspected bronchiectatic cases of some standing, where bilateral lesions may be expected, one likes to get a more illuminating filling of the whole lower bronchial tree, which would disclose more than mere bulbous endings. Moreover, the easy method employed makes a "repeat" on the other lung, a few days later, quite unobjectionable.

Hence Dr. Cotter Harvey's complaint of my films being unilateral.

All the same, I think his method of attacking both bases at one sitting with a small amount of lipiodol is, in certain cases, a highly commendable one.

Again, in attempting to make my article reasonably short, I omitted histories and details of cases, contenting myself with short captions, attached to the figures, that sometimes lack the clarity that notes would have given.

Figure VII, for example, represents a case at a time when strong protests were appearing against the use of lipiodol in tubercular cases. I had found in all my cases of tuberculosis no untoward sequelæ; rather the reverse. This was a suspected tuberculosis with very equivocal findings—clinical and X ray—over a limited lung area. Here, I think, lipiodol shows (more emphatic in the film than in the print) a definite lung lesion, which is always encouraging in contemplating a compression. The subsequent finding of tubercle bacilli confirmed this.

On the other hand, I am at one with Dr. Cotter Harvey in stressing that lipiodol fulfils its highest use, not in demonstrating tuberculous lesions, but in refuting them. And here I may say that I do not think, when I referred to the work of Armand-Delille and Moncrieff on this particular aspect of the use of lipiodol, that I strained the meaning of the context of their paper, as Dr. Cotter Harvey suggests.

Figure XVI is that of a possible "Grawitz" bronchiectasis, usually a unilateral lesion. In this case X ray and clinical findings gave a perfectly normal left lung and one never dreamed of trying it out with lipiodol. The tiny blob or two of lipiodol that spilled over into the other side, giving the appearance of minute dilatation, would be no contra-indication to compression of the other lung, if it had been practicable.

Figure IV: Here Dr. Cotter Harvey's "captious criticism" would have been curbed had I inserted the word "simple" before bronchiectasis. This is one of the rare equivocal lipiodol fillings that could be easily misinterpreted.

Figure III: The caption in this case is "highly provocative". Perhaps it was meant to be so!

In conclusion, I should like to say that healthy criticism such as Dr. Cotter Harvey indulges in can only lead to the emphasizing and better understanding of the object of my paper, namely, the stimulation of interest in a method of lung diagnosis and possibly of lung therapy that has not reached anything like its limit of possibilities, and if the impression is left from his closing paragraph that I have not stressed sufficiently the necessity for closely correlating with it all that goes to make up a bedside record of the case, I take this opportunity of emphatically doing so.

Yours, etc.,

J. F. MACKEDDIE.

The Baker Institute,
Melbourne.
December 7, 1931.

EDUCATION—MEDICAL AND OTHERWISE.

SIR: Nowadays education connotes "health of body, truth of mind, and good will of spirit", and, naturally, ever increasing complexity in evolution should carry with it advances in education. It is only, as the Aberdonian expert, Thomson, says, "in wild Nature, that there is practically no disease", otherwise health is more natural and far less costly than disease.

Naturally also, since, according to Jean, even our teachers are "only three-day-old infants", medical requirements, like science generally, are overdue for a radical investigation and reform, both in ideas and activities. It is surely worse than useless to proceed in wrong directions, and even then, in the distant future, how can we expect to reach the desired haven?

Of course, the soil on which to sow the seed to best advantage is a national health conscience, which is only just being born, and talk as we like on *salus populi suprema lex*, we cannot yet expect parliament to take on initiation or legislation. But we certainly do expect our expert advisers to bring to bear accepted common sense and to make their influence felt far and wide. Unfortunately, as a body, they do neither. Permit me to give a few examples.

1. Public health is only "the fat friend" of personal health. Yet today, in Victoria at least, personal health of students in both theory and practice receives less attention than it did some twenty years ago. So far back as 1896 the Dunedin Medical Congress resolved that "against consumption, the greatest safeguard is personal health". How few general practitioners, even today, so treat it? Surely because of its poor place in the medical curriculum! The same applies to disease generally.

2. The latest Brisbane Congress resolved that psychology should be made a fundamental subject of study. Following the practice elsewhere, outsiders here are now establishing a Council of Mental Hygiene, from whose labours we rightly expect great results. But our medical school still lacks even a lecturer on psychology!

3. In 1924 the League of Nations, recognizing that childhood is the age of habit forming and character building, drew up its "Magna Charta of the child"—only five hundred years after that of Englishmen. This year our faculty accepts without comment the teaching of mothercraft (80% of girls marry) in some four and a half hours in our State schools, under absurd conditions, and only long after governments and municipal councils have regarded it is a national duty, it has the audacity to require for its medical students, whose will be the responsibility of treatment, "two days' visit to a recognized training school", without any of the usual safeguards, even without examination! What a difference in the way in which it deals with diseases of children!

4. Entrenched within its own citadel, and ignoring the fact that even doctors exist for the good of patients, and that "life is a battle", too often, like Gallio, it "cares for none of these things" and is not even officially represented on our Council of Education. Yet health is inseparably connected with education, and disease comes from ignorance and disobedience as well as from inheritance. Thus knowledge often enables us to cease doing what we ought not to do and to do those things which we ought to do; otherwise "there is no health in us". Even the Latin word for salvation is the same as that for health.

5. So it has come about that the main tools of the practitioner are "prescriptions and the knife", and that for mental hygiene and many unnecessary ailments the public visit quacks or find refuge in reformatories, gaols or asylums. What a catastrophe!

6. So, too, it has come about that, as population increases, we are ever building more and more hospitals—building even when we lack funds for maintenance. Surely it should be the other way about: more education, better health and less disease.

7. And when our students leave our medical school, up to date in the latest instruments of precision, skilled in the pathological substratum, apt to disentangle symptoms, even artists in their removal, is it not only too frequently the case that disease, not health, has become their objective and that, from the causation standpoint, they are too ready to disregard, at times even not to know, that most disease is a crop, dependent not only one the seed, but at times even more upon the soil (the individual constitution) and almost always upon anything which gives the seed a start. So, at any rate, practically all biologists are now agreed.

With such beliefs and after such experience, reformers seek two main reforms: (i) That medical faculties and university councils take an up-to-date and broader view of their responsibilities. (ii) That hospitals be no longer regarded as the last resort of the sick, but open "departments for advice". The latter is the administrative side of the axiom, "prevention is better than cure", and the five years' experience of the pioneer health centre, Peckham, has proved its value, which has received the *imprimatur* of the President of the Royal College of Surgeons and of the Master of Balliol, Oxford. Why not revolutionize medical training, just as science has already revolutionized physics, chemistry, astronomy and philosophy?

Yours, etc.,

J. W. SPRINGTHORPE, M.A., M.D.

32, Collins Street,
Melbourne,
December 8, 1931.

"AVERTIN."

SIR: I can relate an experience with "Avertin" anæsthesia similar to that described by Dr. H. W. Horn in THE MEDICAL JOURNAL OF AUSTRALIA of December 12, 1931.

The patient, also a female, aged thirty-one years, weight nine stone ten pounds (61·7 kilograms), was given 6·2 cubic centimetres (0·1 cubic centimetre per kilogram) "Avertin" in 2·5% solution of distilled water, prior to a curette for an incomplete abortion with no premedication. A small amount of open ether was given during the operation. Towards the end of the operation, pallor and shallow breathing gave rise to some anxiety, which increased as the patient was returned to bed. Strychnine one-twentieth grain, adrenaline solution eight minims were given and a hot rectal saline followed. The pulse was very soft, but never went about 80 per minute or became irregular. In half an hour the patient's condition had improved satisfactorily.

I attributed the condition in this case to a form of vaso-motor shock, or at least to some closely allied condition brought on during dilatation of the cervix, which in itself is often associated with shock apart from any effect "Avertin" might have. With Dr. Dun, of Warialda, I have given "Avertin" in a good many cases and we have noticed this pallor several times, but only in female patients. Males evidently have a more stabilized vaso-motor mechanism.

It is essential in preparing the "Avertin" solution to maintain the temperature of the solvent above body temperature. I have found a temperature of 104° F. to be the most satisfactory for dissolving the "Avertin", as the cooler "Avertin" and surrounding air soon bring the temperature down to around 100° F. I have seen tiny solid particles in the solution, but as the Congo red test was in order, they were not given further thought. I think in Dr. Horn's case the temperature of the solvent may have got too low.

Yours, etc.,

S. SHINEBERG.

Bingara, New South Wales.
December 12, 1931.

Diary for the Month.

JAN. 12.—New South Wales Branch, B.M.A.: Ethics Committee.
JAN. 19.—New South Wales Branch, B.M.A.: Executive and Finance Committee.
JAN. 27.—Victorian Branch, B.M.A.: Council.

Medical Appointments.

Dr. F. R. Hone (B.M.A.) has been appointed Honorary Physician at the Northfield Consumptive Home, South Australia.

* * *

Dr. I. S. Magarey (B.M.A.) has been appointed Acting Honorary Physician at the Northfield Consumptive Home, South Australia.

* * *

Dr. H. Rogerson (B.M.A.) has been appointed Acting Medical Superintendent of the Hospital for the Insane, Kew, Victoria, pursuant to the provisions of the *Lunacy Act*, 1928.

Medical Appointments Vacant, etc.

For announcements of medical appointments vacant, assistants, *locum tenentes*, sought, etc., see "Advertiser," page xiv.

LAUNCESTON PUBLIC HOSPITAL, TASMANIA: Resident Medical Officer (male).
MANLY DISTRICT HOSPITAL, SYDNEY, NEW SOUTH WALES: Two Honorary Consulting Surgeons.
PERTH HOSPITAL, PERTH, WESTERN AUSTRALIA: Resident Registrar.
THE UNIVERSITY OF MELBOURNE, VICTORIA: Beaney Scholar in Pathology.

Medical Appointments: Important Notice.

MEDICAL practitioners are requested not to apply for any appointment referred to in the following table, without having first communicated with the Honorary Secretary of the Branch named in the first column, or with the Medical Secretary of the British Medical Association, Tavistock Square, London, W.C.1.

BRANCH.	APPOINTMENTS.
NEW SOUTH WALES: Honorary Secretary, 135, Macquarie Street, Sydney.	Australian Natives' Association. Ashfield and District United Friendly Societies' Dispensary. Balmain United Friendly Societies' Dispensary. Friendly Society Lodges at Casino. Leichhardt and Petersham United Friendly Societies' Dispensary. Manchester Unity Medical and Dispensing Institute, Oxford Street, Sydney. North Sydney Friendly Societies' Dispensary Limited. People's Prudential Assurance Company Limited. Phœnix Mutual Provident Society.
VICTORIAN: Honorary Secretary, Medical Society Hall, East Melbourne.	All Institutes or Medical Dispensaries. Australian Prudential Association, Proprietary, Limited. Mutual National Provident Club. National Provident Association. Hospital or other appointments outside Victoria.
QUEENSLAND: Honorary Secretary, B.M.A. Building, Adelaide Street, Brisbane.	Members desiring to accept appointment in ANY COUNTRY HOSPITAL, are advised to submit a copy of their agreement to the Council before signing, in their own interests. Brisbane Associated Friendly Societies' Medical Institute. Mount Isa Mines. Toowoomba Associated Friendly Societies' Medical Institute.
SOUTH AUSTRALIAN: Secretary, 207, North Terrace, Adelaide.	All Lodge Appointments in South Australia. All Contract Practice Appointments in South Australia.
WESTERN AUSTRALIAN: Honorary Secretary, 65, Saint George's Terrace, Perth.	All Contract Practice Appointments in Western Australia.
NEW ZEALAND (Wellington Division): Honorary Secretary, Wellington.	Friendly Society Lodges, Wellington, New Zealand.

Editorial Notices.

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